Social Ties and Preferences for Competition*

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Abstract

We conduct an economic experiment to examine the causal impact of social ties on the preference for competition. Participants decide whether to engage in a competition or not. Across four treatments, potential competitors vary based on their relationship with the decision-maker: whether they had a conversation with the decision-maker prior to the competition, whether they are expected to chat after the competition, or both, or neither. We find that the process of chatting promotes social closeness. This increase in social closeness tends to reduce the preference for competition if participants are expected to meet again after the competition. However, it does not change the likelihood of opting for competition if there is no prospect of further interaction. Through this experiment, we thus identify previously undiscovered implications of managerial practices that promote social tie formation, like team-building exercises and options for remote work.

Keywords: competition, social ties, closeness, experiment.

JEL: C91, C92, D71, J22, M51.

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1 Introduction

"At some point my friends became my competitors. I did not like it at all."
(Gerlinde Kaltenbrunner, Austrian mountaineer.)

Being unwilling to compete against friends, to the extent of ending a promising career that involves competitions, might suggest Gerlinde Kaltenbrunner is a very unusual person.[1] However, it might also be that such discomfort reflects a more general pattern. Understanding how friendships and other forms of social ties influence an individual's willingness to compete can be important in workplace settings, where social ties are a crucial determinant of the team atmosphere and the wider company culture.

Workplace atmosphere and incentive structures are fundamental to modern organizations and are widely considered to be key drivers of organizational success (Dahlin et al., 2008; Graham et al., 2022; Alan et al., 2023; Erkut and Reuben, 2023). Even though the importance of both is widely documented, less is known about the interplay between them. First, it is difficult to isolate the determinants of workplace atmosphere, and second, the direction of causality between incentive structures and workplace atmosphere can be ambiguous (Guiso et al., 2015). Consider team managers who wish to improve company performance by fostering social ties among employees, and who incentivize effort via a competitive end-of-year bonus that is provided to the best performing team member. To inform managers about useful approaches in this context, our paper offers a more detailed understanding of the connection between social ties and willingness to compete. We provide causal evidence for how social ties affect individual's willingness to compete.

To test whether and how social ties influence individual's willingness to compete, we run an online experiment that allows us to manipulate the strength of, and future expectations in regard to, social ties between individuals. In contrast to prior studies and laboratory work on the effects of social ties, we specifically design our experiment so as to disentangle two dimensions of social ties, following Granovetter (1973): whether individuals know each other, and whether they expect to encounter each other again. Both of these channels play an important role in designing workplace policies.

We design our experiment over three main stages. In the first stage (Chat I), subjects engage in a chat. Afterwards, in the Task stage, we measure the willingness to compete by offering a choice between a competitive incentive scheme and an incentive scheme based on individual performance. Afterwards, the subjects engage in another chat (Chat II). We vary the matching between the stages in two dimensions: 1) whether the Task stage involves the same group composition as the

[1] Gerlinde Kaltenbrunner used to participate in competitive alpine skiing during her teenage years. Although her ski racing career was promising, she stopped participating in competitions and focused on alpine climbing instead. In a 2020 interview, from which the above quotation is taken, she explained that her switch of careers was due to discomfort she felt from having to compete against her friends as a ski racer. Gerlinde Kaltenbrunner has climbed all 14 8'000 meter mountains; she was awarded the National Geographic Explorer of the Year award in 2012.

Chat I stage, and 2) whether the Task stage involves the same group composition as the Chat II stage. In total, this results in four different treatments: (i) a setting where subjects choose whether to compete against unknown subjects that they will also not meet again (*No-Ties*); (ii) a setting where subjects choose whether to compete against others they previously met in the Chat I stage of the experiment, but will not encounter again in the Chat II stage (*Weak-Ties*); (iii) a setting in which subjects choose whether to compete against unknown subjects that they will interact with afterwards (*Future-Prospect*); (iv) a setting in which subjects choose whether to compete against subjects they previously met and will encounter again in the subsequent chat (*Weak-Ties w/ Future-Prospect*).

We find that, compared to anonymous strangers, subjects who feel closer to each other after the first chat and who expect to encounter each other again are less willing to compete against each other. When investigating the mechanisms behind this effect, we find that neither meeting after the competition (*Future-Prospect*) nor having met previously (*Weak-Ties*) separately explain the observed effect. Instead, we find that feeling close to the other person only reduces individuals' willingness to compete against each other if the subjects expect to meet each other again after the competition. Thus, our findings support the hypothesis on the importance of maintaining social ties in explaining willingness to compete.

We further investigate whether social ties are an accelerating (or mitigating) factor for the well-documented gender difference in preferences for competition (Niederle and Vesterlund, 2007). Several studies from the social cognition literature provide potential evidence of a gender difference in the effect of social ties (Hall et al., 2016; Thomas and Fletcher, 2003; Schulte-Rüther et al., 2008; Costa Jr et al., 2001; Chapman et al., 2007; Weisberg et al., 2011; Friebel et al., 2021). While our findings in the treatments without previous interaction show a significantly greater willingness to compete for men, which is consistent with the seminal study of Niederle and Vesterlund (2007) and many subsequent studies, we do not find any significant gender differences in the treatments where subjects interacted before choosing the incentive scheme (*Weak-Ties* or *Weak-Ties w/Future-Prospect*).

Our work broadens the existing literature in various sub-fields. First, we contribute to the extensive literature investigating the effects of workplace atmosphere on organizational success. A positive workplace atmosphere is mainly associated with benefits for workers and organizational performance (Boyce et al., 2015; Martinez et al., 2015; Gartenberg et al., 2019; Guiso et al., 2015). Less is known about the underlying mechanisms behind this, and how the atmosphere interacts with intra-organizational formal institutions (Graham et al., 2022; Erkut and Reuben, 2023): first, because of the difficulty of isolating the factors that determine workplace atmosphere, and second, because of reverse causality concerns. It is well established that social ties among co-workers are a fundamental part of the workplace atmosphere. For example, Gächter et al. (2023) study so-called group cohesion focusing on social relationships as factors of production. They examine the aggregate closeness of ties within a group as a summary metric for team social relationships and use experimental evidence to conclude that social ties matter for team production in weak-link coor-

dination games (Gächter et al., 2015; Cialdini et al., 1997). We contribute to understanding how social ties interact with competitive incentive structures by providing causal evidence of the effect of social ties on individuals' willingness to compete against each other. Since competitive incentive structures are common elements of organizations, understanding how social ties and preferences for competition interact is crucial for designing efficient workplace policies (Graham et al., 2022).

Second, we contribute to the literature on the importance of social ties for social decision-making beyond the intra-organizational context. The importance of social ties for understanding social decision-making has been widely recognized. An extensive literature provides evidence that social ties matter in various contexts, such as in relation to resource sharing, collective action, fair business dealings, and venture building (Akerlof, 1982, 1983; Becker, 1974; Granovetter, 1985; Coleman, 1984; Uzzi, 1999; Abbink et al., 2006; Roberts and Sterling, 2012). There is also substantial experimental literature on the importance of social ties for economic behavior, for example, related to cooperation (Apicella et al., 2012), coordination and conflict (Reuben and Van Winden, 2008), trust and trustworthiness (Glaeser et al., 2000), bribery and corruption (Di Zheng et al., 2021), norm enforcement (Goette et al., 2012) and conformity (Goette and Tripodi, 2021). The latter demonstrates an important example of social proximity effects when the actions of group members are interdependent but not directly observable. Social ties have also been shown to matter in various contexts, such as for regional growth (Burchardi and Hassan, 2013), neighborhoods, charitable giving (Goette and Tripodi, 2021), and professional relationships within and outside organizations (Sonnemans et al., 2006). But social ties are not equally advantageous across all types of tasks, as there is a positive effect on coordination in games with strategic complements, but this effect is absent in games with strategic substitutes (Chierchia et al., 2020). We extend this literature by investigating the role of social ties in shaping willingness to compete. There is limited evidence on this intersection to date. In an early adolescent sample, Schneider et al. (2005) found descriptive evidence for a negative relationship between friendship and competition. They showed that boys exhibited stronger preferences for competition against their peers than girls. Meanwhile, the focus of adult studies in the context of friendships and competition has often been on the competition for romantic partners in particular (see Hibbard and Walton, 2017, for a review).

Studies within the behavioral economics literature that come closest to ours are Muñoz-Herrera and Reuben (2023), Cornaglia et al. (2019), Mill and Morgan (2022), and Schäfer (2023). Muñoz-Herrera and Reuben (2023) studied the choice of a partner in a trust game after different forms of communication and differently competitive environments. They found that a more personal relationship (formed in a free-form chat) led to inefficiencies in competitive environments. The strong ties that subjects formed in their experiment led to inefficient trading-partners, undermining the potential efficiency gains of competition. Cornaglia et al. (2019) examined the effect of group identity on individual behavior, looking into the effect of group membership on competition preferences. They manipulated group identity by adopting a minimal group paradigm and asking subjects to perform a problem-solving task individually or in groups with chat communication. The subjects were then matched in in-group, out-group, or random pairs and participated in four different tasks that were similar in design but differed in how subjects were paid, similar to Niederle

and Vesterlund (2007). They found that group membership stimulated pro-social attitudes toward other group members, and that subjects showed stronger competitiveness in in-group matchings than in out-group matchings or a control setting without group identity, echoing a large literature on group membership and social identity in various strategic contexts (Chapman et al., 2007; Chen and Li, 2009; Chen and Chen, 2011; Charness et al., 2007; Akerlof and Kranton, 2000). In fact, they found that group membership amplified competitive behavior within the group already after initial interaction, without considering the prospect of repeated future interaction. Mill and Morgan (2022) investigated auction bidding behavior in the lab between subjects describing themselves as either Republican or Democrat in the context of the US political system. They found more aggressive bidding behavior against out-group members compared to in-group members. Finally, Schäfer (2023) examined the effect of real-world friendships on behavior in laboratory markets. He found that friendships have similar effects as mergers, namely, friendships between people that sell complementary goods decrease prices and increase efficiency, whereas friendships between people with substitute goods cause the opposite effects. These results are consistent with the directed altruism theory.

In contrast to Cornaglia et al. (2019), we abstract from group membership and focus on the effect of social ties for willingness to compete. The treatment in Cornaglia et al. (2019) included three elements: manipulation of group identity, interaction in a chat, and cooperation on a joint task. We abstract from manipulating group identity (to avoid potential countervailing effects). In contrast to Mill and Morgan (2022), we focus on the willingness to compete instead of on competitive behavior in auction bidding. Furthermore, our paper explicitly focuses on the effect of social ties by also measuring the social closeness between subjects. Our findings complement all three of these studies by highlighting the extensive margin effects of social ties on competitiveness. In contrast to the existing studies, we provide causal evidence for the underlying mechanisms of social ties by highlighting the crucial role of future interactions.

Third, we contribute to the extensive literature on preferences for competition. Personality traits or non-cognitive skills have often been shown to be stable predictors of education and labor market outcomes. Among those traits, competitiveness has received considerable attention following the seminal studies by Gneezy et al. (2003) and Niederle and Vesterlund (2007). Several studies have shown a positive correlation between measures of competitiveness and labor market performance (Buser et al., 2014; Niederle, 2017), while other still-growing literature investigates the drivers of competitiveness. Numerous lab and field studies have discussed the role of demographic factors (e.g., gender[2]) as well as socio-economic factors and socio-environmental factors (Gneezy et al., 2009; Cornaglia et al., 2019; Booth et al., 2019). We contribute to this literature by exploring the relationship between social ties and willingness to compete. Most experimental lab studies on the determinants of willingness to compete focus on anonymous agents. However, several studies following Bohnet and Frey (1999) have demonstrated the importance of relaxing this assumption for studying social decision making. We identify social closeness and social ties as causal drivers of individuals' willingness to compete.

[2]For an overview of gender differences in willingness to compete and potential mitigating factors, see Niederle (2017).

Our results have important implications for managers who seek to design efficient work processes. Consider a manager who is concerned that competitive reward structures may result in unproductive competition between co-workers instead of collaborative work in the interests of the company's success. Our results demonstrate that the manager will see potential positive returns on investment in tie-forming activities such as team-building events, on-premises work schemes and other office policies (Yang et al., 2022). Now consider another manager who instead cares more about her employees participating in a promotion tournament for a leading role, and who is interested in maximizing participation in the tournament. Our results suggest that social ties among employees may have an undesirable effect for this manager. By designing office policies and organizing team-building events, she can affect social tie formation among co-workers and, in turn, the willingness of her workers to compete against each other. By making sure there is no interaction between the potential contestants after the competition, she can avoid reduced willingness to compete. Benson et al. (2019) provide suggestive evidence that is in line with our results. They examine data from 131 U.S.-based firms with over 38'000 sales workers, of whom more than 1'000 were promoted to managerial roles. They argue that "promotions can be considered a tournament" (p. 2103) and observe that the promoted sales workers in the dataset tend to get rotated away to manage a different team than the one they were in before the promotion (this fits 76% of the examined promotions). Thus, companies strategically use cross-department promotion schemes to avoid potentially harmful encounters with former co-workers with existing social ties.

2 Experimental Design and Procedure

Using real-world data to study the causal impact of existing and future social ties is challenging, for at least two reasons. First, whether interactions between individuals in the real world take place or not is usually not randomly assigned but endogenous. Second, whether interactions persist or are broken up is also selective in real-world interactions. Examining the causal impact of such forms of social ties on any outcome is, therefore, almost impossible without exogenous manipulation. A highly controlled environment like an (online) experiment where the experimenters randomly allocate participants in different treatments can address many of these endogeneity concerns. As previously shown, experiments are also a reasonable approach to measuring our outcome variable: the willingness to enter a competition (see e.g. Gneezy et al., 2003; Niederle and Vesterlund, 2007). In the following, we lay out the details of the experimental protocol.

At the beginning of the experiment and before reading the instructions, subjects state their gender.[3] Afterwards, a nickname is randomly allocated to each subject. This nickname guarantees that anonymity is preserved, but individuals are still recognizable to each other within the experiment. This nickname consists of a prefix *Mr.* or *Ms.* and the name of an animal.[4] Subjects in

[3]We only invited individuals who claimed to be either male or female to participate. Therefore, we only allowed a choice between male and female.

[4]The name of the animal was randomly chosen from the list of 60 *Anonymous Animals* of Google Docs. It was ensured that each name was unique within a matching group. The gender of the subject determined the prefix.

the experiment learn their nickname and the nicknames of the two other subjects they chat with during Chat I. After showing only the nicknames of the two other chat partners in Chat I, we elicit subjects' closeness to each of the other two group members using the Inclusion of Others in the Self scale (IOS).[5] On this scale, subjects indicate how close they feel toward each of the two other subjects on a 7-point scale represented by overlapping circles. In Chat I, subjects chat in groups of three for 10 minutes. There are no restrictions on what people can write, except that subjects are not allowed to reveal their real-world identities. Thirty seconds into the chat, a topic to discuss is proposed. After three minutes and then again after six minutes, another topic is proposed. The topics to discuss that appear on the screen are taken from Aron et al. (1997) and are a part of the validated method for increasing interpersonal closeness.[6] After 10 minutes, the chat closes automatically and subjects are again asked to fill out the IOS scale measuring the closeness to each of the other two subjects of Chat I.

In the Matching stage, the treatment variation takes place. Subjects receive the instructions for the subsequent stages and learn that the task consists of finding words in a letter grid. In particular, they learn the nicknames of the other two group members in the Task stage and Chat II stage. Depending on the treatment, these are unknown group members or members they are familiar with. Further, they learn that they can choose whether to do the task competitively or individually, and they see the resulting payoff rule for each of the two options.

The Task stage elicits the main outcome variable: subjects choose whether to play competitively or individually. On the choice screen, subjects learn the payoff rules of each. Playing the task individually leads to the following payoff:

$$\Pi_{Individual}(s_i) = 3€ + 10€ - (0.05€ \times s_i)$$

where s_i determines the number of seconds the individual needs to solve the task. If a subject does not solve the task, it ends after 200 seconds. Not solving it, therefore, leads to a payoff of 3€ in this stage. If a subject chooses competition, the payoff is calculated as follows:

$$\Pi_{Competition}(s_i, s_{-i}) = \begin{cases} 3€ + n \times (10€ - (0.05€ \times s_i)) & if \quad s_i < s_{-i} \\ 3€ & if \quad s_i > s_{-i} \end{cases}$$

where s_i determines the number of seconds the individual needs to solve the task and s_{-i} denotes the number of seconds the fastest other subject who chose competition needs to solve the task. n depicts the number of players who chose competition within the group of three.[7] The Task stage ends for a subject when the task is solved or after 200 seconds. The task does not end for other group members if one competitor has already solved it. For that reason, we also obtain data on the performance of the losing subject and ensure that no information about the competitors' per-

[5]The IOS scale originates from the psychology literature (Aron et al., 1992) and has been validated by economists in regard to the closeness of individuals and groups (Gächter et al., 2015, 2022; Baader et al., 2023).

[6]In Chat I, the topics are: *1) If you could choose among all the people in the world, who would you like to invite for dinner?*, *2) What would you like to ask an omniscient crystal ball?*, *3) How would you continue the following sentence: 'I wish I had someone with whom I ...'.*

[7]The options are neutrally labeled as option A and option B. The options' labels and order of appearance are randomized on the matching group level.

formance can be inferred while solving the task.

In our design, subjects cannot force others into the competition, as each participant can choose to play individually instead. Therefore, when choosing competition, subjects indicate their willingness to compete against those players in the group who also chose competition. Further, by choosing to compete, subjects also increase the size of the prize accordingly, such that others' expected payoffs remain the same when choosing competition or individual incentives. This design limits the externalities individuals impose on others when choosing competition. Although many real-world examples might also include externalities, the resulting effect represents a lower bound on the overall effect. Based on the social preference literature, it is natural to assume that social ties matter for the willingness to impose a burden on other individuals. By excluding these kinds of externalities by design, we can focus more distinctly on the true change in willingness to compete.

Before subjects choose whether to play the letter grid task individually or competitively, they can look at an example of the game on two consecutive screens. This is meant to reduce the ambiguity for the subjects about what to expect. We store the extensive margin (whether and how often subjects check the example screen) and the intensive margin (how many seconds this screen is opened). Further, subjects are reminded again with whom they are matched in the Task and Chat II stages. On the next screen, after choosing the payment scheme, subjects are asked to indicate their belief about the likelihood that the potential competitors will choose to compete. Each subject chooses an answer on a 6-point Likert scale from very unlikely to very likely for each of the two potential competitors (unincentivized).

While a timer runs down until the start of the letter grid task, subjects are either reminded that they will play individually or are informed about the nickname(s) of the other subject(s) in their three-person group who also chose competition. Afterward, the task starts: a letter grid with 10x10 letters is shown. Three German words are hidden and have to be found. We created four different letter grids, and it is randomized at the session level which letter grid is played. Subjects who chose to play individually are informed about their payoff afterward. Subjects who chose the competition are informed about their payoff and the nickname of the subject who won/lost the competition.

The IOS scale is again repeated before the Chat II stage. Each subject is now asked to state the level of interpersonal closeness to the two subjects they will be paired with in Chat II. Chat II lasts 10 minutes, and three new suggested topics are shown after 30 seconds, three minutes, and six minutes respectively.[8] After Chat II, subjects are again asked to fill out the IOS questions in regard to the other players in Chat II.

In the Covariates stage, to elicit risk preferences, the subjects then play the *bomb task* (Crosetto and Filippin, 2013) where 25 boxes are shown and subjects must tag the boxes. One box contains the *bomb*, and selecting this *bomb* leads to zero payoffs in this task. If the *bomb* box is not selected,

[8]The three questions in Chat II are *1) What corresponds to a perfect day in your opinion?*, *2) Is there something you dreamt about for a long time? Why didn't you put it into practice?*, *3) Provide truthful 'we' statements. e.g. 'We in this chat feel ...'.* These questions are again modified versions of the questions in Aron et al. (1997).

subjects receive 20 Eurocents for every box selected. Feedback for the *bomb* task is provided immediately afterward. Subsequently, subjects individually answer seven questions related to cognitive ability. The questions are based on the Cognitive Reflection Test (CRT) of Toplak et al. (2014). As we run the experiment online, we slightly change the wording of the questions to reduce the possibility of subjects finding the answers through online search engines. Each correctly answered question leads to a payoff of 50 Eurocent. Afterward, subjects are incentivized to correctly guess how many questions they answered correctly (they receive 1 Euro in the case of a correct guess), and subjects have to guess the rounded-up average of the number of correct questions of every other subject in the same session (subjects earn 1 Euro in case of a correct answer). At the end of the experiment, subjects see overall feedback on their earnings.

After the feedback screen, subjects are asked to answer a non-incentivized post-experimental questionnaire, including socio-economic questions, a short Big 5 questionnaire (Gosling et al., 2003), and open questions about behavior in the experiment. Details on instructions and decision screens can be found in Appendix C.

Timeline. To summarize, the experiment consists of one round with the following stages:

Stage 0 Subjects declare their gender and receive a randomly chosen nickname.

Chat I Subjects chat in groups of three. Before and after Chat I, subjects declare their closeness to each of the two other Chat I group members on the IOS scale.

Matching Subjects learn about the group composition in the subsequent stages and the nicknames of the other subjects in the Task stage and Chat II stage. The matching stage varies between treatments.

Task Subjects choose whether to play a letter grid task individually against the clock or in competition against up to two competitors. Afterward, each subject plays the letter grid game according to her choice.

Chat II Subjects chat in groups of three. Before and after Chat II, subjects declare the closeness to each of the two other Chat II group members on the IOS scale.

Covariates Subjects perform a risk task, answer CRT questions, guess the performance of others in the CRT questions, and fill out a non-incentivized post-experimental questionnaire.

Treatments. The treatments differ in the matching between Chat I, the Task stage (either played individually or in competition), and Chat II. The two dimensions of the 2x2 factorial design differ in whether the groups of three are 1) identical in Chat I and the Task or 2) identical in the Task and Chat II, or both, or neither. The *Weak-Ties w/Future-Prospect* treatment has the same three group members in all stages. The *No-Ties* treatment has different group members in the Chat I, the Task and the Chat II stages. The other two interim treatments, *Weak-Ties* [*Future-Prospect*] have the same group composition in Chat I and the Task [the Task and Chat II]. Table 1 provides a treatment overview. Treatments are varied between sessions.

		Group composition across Chat I and Task	
		Different	Same
Group composition across Chat II and Task	Different	**No-Ties**	**Weak-Ties**
	Same	**Future-Prospect**	**Weak-Ties w/ Future-Prospect**

Table 1: Treatment overview

Procedure. The experimental sessions were run between March and September 2021.[9] Fluent German-speaking subjects were recruited from the standard student subject pool of the University of Konstanz via hroot (Bock et al., 2014). In total, 446 subjects (63.45 % female, 36.55 % male) participated in 25 sessions, usually with 18 subjects per session.[10] The experiment lasted 60 minutes on average , including the online introduction and the post-experimental questionnaire. The subjects earned on average 13.82 Euros (sd = 5.38), including a show-up fee of 3.00 Euros. The subjects entered their IBAN at the end of the experiment and received their earnings via bank transfer in the days following the session. To guarantee anonymity, the IBAN and the name were never stored in the same place as the experimental data. Matching groups were randomly formed with nine subjects in the *No-Ties*, *Future-Prospect*, and *Weak-Ties* treatments. The *Weak-Ties w/Future-Prospect* treatment had a matching group size of three.

3 Results

In this section, we present the main results of the experiment. We begin by briefly summarizing competition rates across all four treatments. Subsection 3.1 explores the relevance of closeness in each treatment in more detail. Subsequently, to get a deeper understanding of the relevance of future prospects, Subsection 3.2 presents the difference between *Weak-Ties with Future-Prospects* and *Weak-Ties*. Robustness checks are presented in Subsection 3.3. Unless stated otherwise, all presented standard errors are clustered at the matching group level.

We first demonstrate why closeness measures are an integral part of the analysis. Figure 1 shows the percentage of participants who chose competition, without considering the heterogeneity in interpersonal closeness. Subjects interacted before the task with the potential competitors in treatments *Weak-Ties* and *Weak-Ties w/Future-Prospect*, and after the task in treatments *Future-Prospect* and *Weak-Ties w/Future-Prospect*. In cases where participants chose whether to compete against those they interacted with, 37.5% opted for competition. For those deciding to compete

[9] Due to the Covid-19 pandemic, the laboratory was closed and the sessions were conducted online using zTree unleashed (Fischbacher, 2007; Duch et al., 2020) While having participants sit in front of their computers at home – as opposed to in our physical laboratory – admittedly comes with some loss of control, it offers two advantages. First, the chat window might feel more natural to them when accessed from home (rather than being physically close to the person they are chatting with). Second, the treatment variation without interaction after the Task stage is stronger, as participants do not have the opportunity to meet each other upon leaving the physical laboratory.

[10] *No-Ties* was the treatment with the lowest share of male subjects (33.3 %) and *Weak-Ties w/Future-Prospect* was the treatment with the highest share of male subjects (40.7 %).

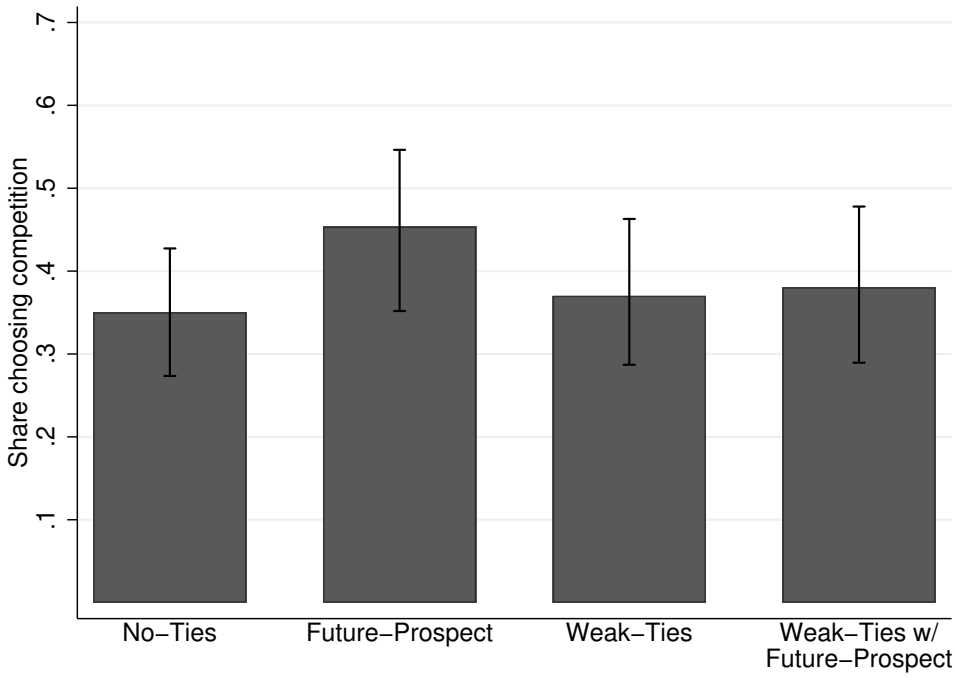


Figure 1: Share of subjects who chose competition across the four treatments.

Note: The whiskers represent 95% confidence intervals based on bootstrapped standard errors (10,000 repetitions with clustering at the matching group level).

against participants they had not interacted with before, 40% chose competition. This difference is not statistically significant. Similarly, there is no significant difference in those who chose competition between participants who met again after competition and participants who did not. One reason for this similarity could be that chatting for 10 minutes heterogeneously affects closeness. In further comparisons, we therefore take into account the heterogeneity in interpersonal closeness.

3.1 The Effect of Interpersonal Closeness

By allowing the subjects to chat, we allowed for the possibility of increasing the subjective closeness between the participants. Using an in-group out-group design, Kranton and Sanders (2017) highlights substantial heterogeneity among individuals in terms of identification with the in-group. Some individuals show a strong response to the treatment, while others do not differentiate between in-group and out-group. Leveraging the participants' responses on the IOS scale, we examine how Chat I influences closeness between the group members and explore the relationship between closeness and preferences for competition under the treatment conditions.

We begin by showing that the Chat successfully increased interpersonal closeness. Figure 2 illustrates the distribution of responses on the 7-point IOS scale just before and immediately after Chat I. Initially, most subjects tended to choose the lowest closeness rating (coded as 1) for both other group members, resulting in an average closeness of 1. After Chat I, however, only a minority of participants selected the lowest point on the scale. On average, Chat I led to an increase of 1.22

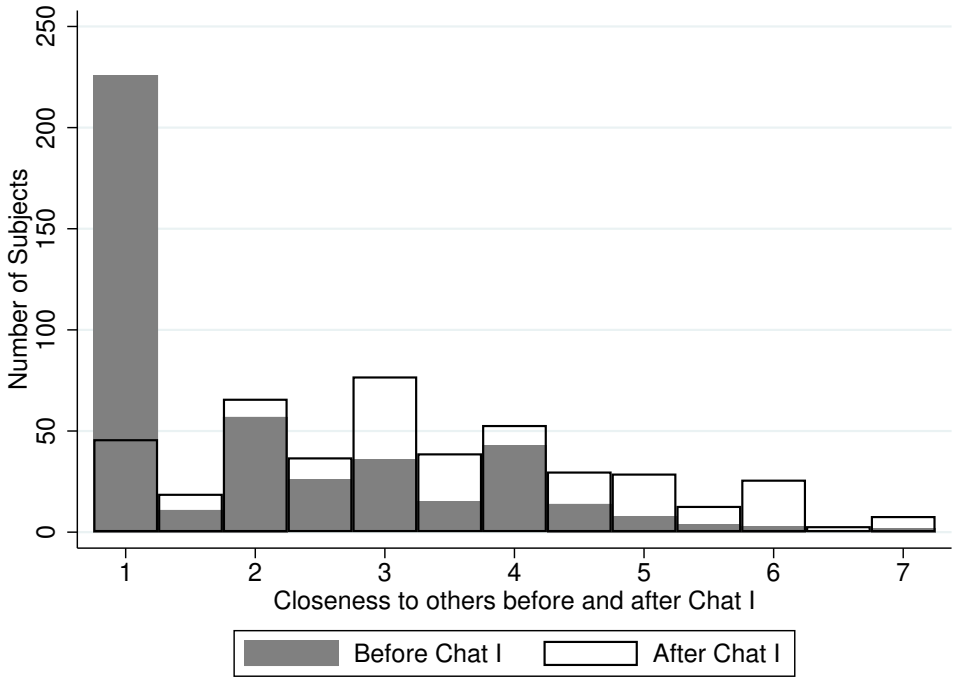


Figure 2: Distribution of closeness to the other two group members right before and right after Chat I, measured using the 7-point IOS scale, with 1 as lowest and 7 as highest.

points on the 7-point scale in subjects' responses on the IOS scale (this increase is highly significant; refer to Section 4.2 for detailed information and covariates related to the increase in closeness).

To investigate the effect of closeness on preferences for competition, we calculate the difference in the average closeness to the other two group members right after and right before Chat I. We henceforth refer to this measure as the *change in closeness*, or Δ *closeness*. Figure 3 illustrates the distribution of change in closeness for each treatment. Notably, the change in closeness is predominantly positive for a significant majority of subjects. There are no substantial differences across treatments in the impact of Chat I on the change in closeness to the group members, showing that the random allocation into the treatments worked well.

In the remainder of this section, we split the data into two groups. Using a median split (which equals a mean split in our data), we create a binary variable indicating a *high change in closeness* or a *low change in closeness* through Chat I. This median split also allows us to represent the findings in the figures in a straightforward way.[11]

Panels 4a to 4d plot the relation between closeness and willingness to compete for each of the four treatments. The figures reveal that the difference between the groups with high- and low change in closeness through Chat I is largest in the *Weak-Ties w/Future-Prospect* treatment. The regressions reported in Table 2 confirm that the difference in the share choosing competition between high- and low change in closeness is only significant in the *Weak-Ties w/Future-Prospect* treatment, and

[11] As outlined in Section 3.3, all our main findings hold when using a continuous measure of the change in closeness instead. Section 3.3 further shows that the findings are not sensitive to different definitions of closeness changes.

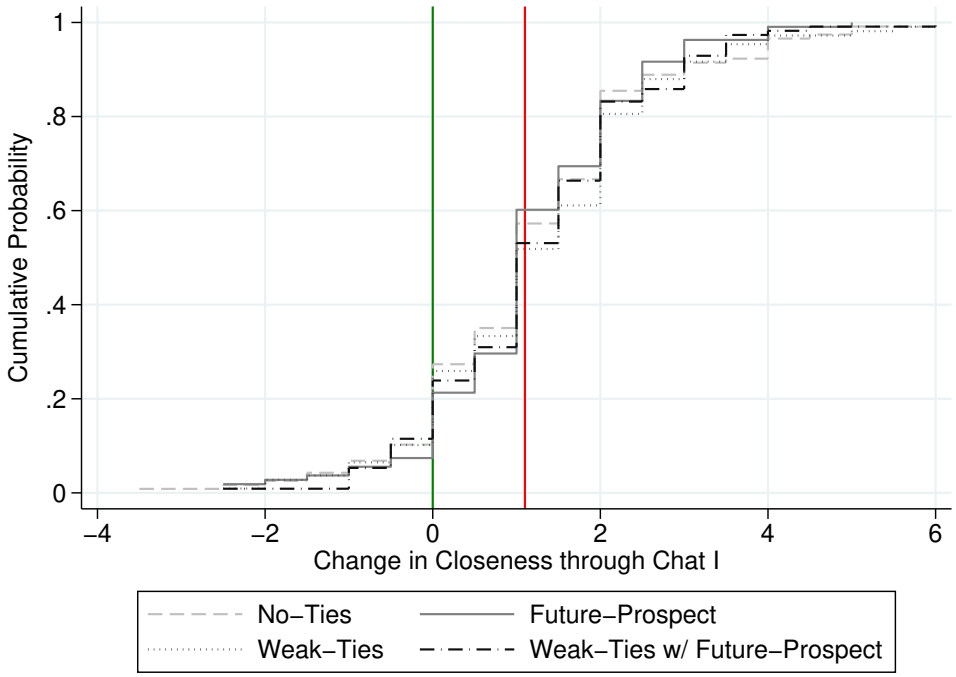
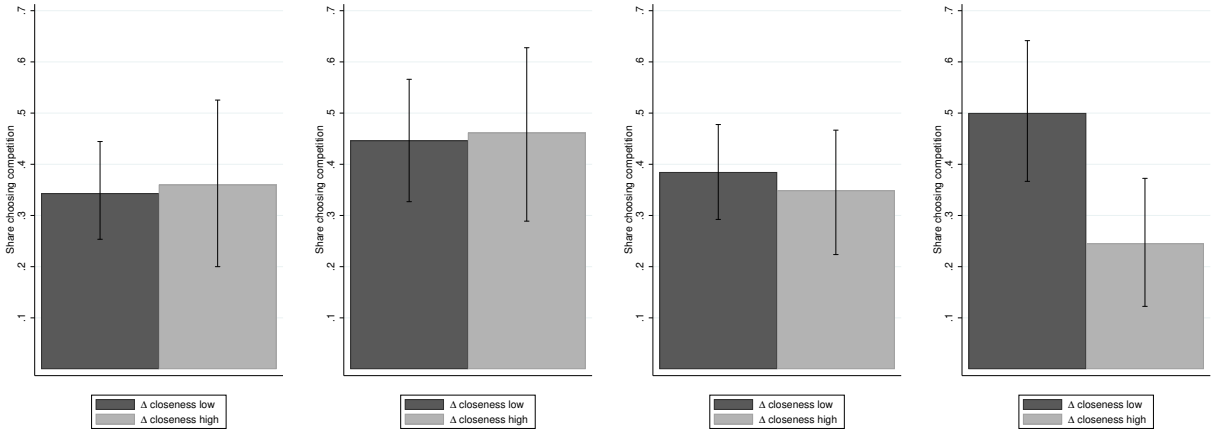


Figure 3: Cumulative distribution function of change in closeness before and after Chat I, separated by treatment. The red vertical line indicates the median split used for Δ *closeness high* and Δ *closeness low* in the remainder of the paper.

insignificant in the other treatments. As various research has shown a connection between willingness to compete and gender, and as the treatments are not perfectly counterbalanced on gender, we also include a gender dummy in the regressions reported in Table 2 (for more details on the role of gender in our setting, see Subsection 4.1). To control for potential differences in the initially indicated level of closeness before Chat I, columns (2), (4), (6) and (8) include it as a control. Columns (1), (2), (3) and (4) show that the difference between high- and low changes in closeness through Chat I in the *No-Ties* and *Future-Prospect* treatments is insignificant and close to zero. This is reassuring, as there is no reason to expect a direct effect in these two treatments: the change in closeness is measured for the two other participants in Chat I, but the potential competitors in the task are other participants that the subjects did not interact with before. In general, there could be a correlation between our measure of the change in closeness and the willingness to compete in the *No-Ties* and *Future-Prospect* treatments. One could imagine, for example, that subjects who tend to increase their subjective closeness more easily, are also more willing to compete. Table 2 shows, however, that the coefficient of the closeness change is close to zero and insignificant in these treatments, showing that this does not seem to be of concern.

Panel 4c and columns (5) and (6) in Table 2 show the effect of closeness on the willingness to compete in the *Weak-Ties* treatment. In this treatment, groups in Chat I and the Task stage remain unchanged; subjects are matched to new participants only after the task in Chat II. Here, one could expect that increased closeness toward the other participants through Chat I influences the willingness to compete against these participants. Our results do not support this claim. The share choosing competition out of all subjects who increased closeness at an above average level via



(a) Treatment No-Ties (b) Treatment Future-Prospect (c) Treatment Weak-Ties (d) Treatment Weak-Ties w/ Future-Prospect

Figure 4: The effect of change in closeness via Chat I on the willingness to compete.

Notes: Δ *closeness low* is defined as a change in average closeness ≤ 1, Δ *closeness high* is defined as a change in average closeness > 1 (i.e., below and above average). The whiskers represent 95% confidence intervals based on bootstrapped standard errors (10,000 repetitions with clustering at the matching group level).

Chat I (38.5%) is almost equal to, and not significantly different from, the share of those who did not increase their closeness above average via Chat I (34.9%).

The only difference between the *Weak-Ties* and the *Weak-Ties w/Future-Prospect* treatment at the moment of competition choice is the knowledge that one will meet the same participants of the Chat I stage and the Task stage again in Chat II (*Weak-Ties w/Future-Prospect*) or not (*Weak-Ties*). Figure 4d and columns (7) and (8) in Table 2 reveal that the increase in closeness in Chat I correlates strongly and significantly with the willingness to compete against the other participants of Chat I, the Task stage and, Chat II. While 50% of those who did not increase their closeness above median via Chat I chose competition in the *Weak-Ties w/Future-Prospect* treatment, only 24.5% of those who increased their closeness via Chat I strongly did so. This finding shows that subjects who felt close to other participants and knew that they would interact with those participants again later were less willing to enter a competition against them than subjects who did not feel very close to the other participants. To complement our analysis in Table 2, we run a pooled regression by adding dummy variables for the different conditions and jointly add the controls over all treatments. The resulting coefficient plot is shown in Figure A.1 and supports the findings of Table 2.

The results of the *Weak-Ties w/Future-Prospect* treatment align with previous findings in the literature, indicating that social ties decrease people's willingness to compete against each other. Mill and Morgan (2022) describe a connection between social ties, closeness, and competition behavior, finding that subjects exhibit less competitiveness toward others who identify with the same political party. However, the downside of such social tie identification is akin to experiments involving real friends and strangers in the laboratory (as conducted in several studies, e.g., Reuben and Van Winden (2008); Cochard et al. (2016)). Since an experimenter cannot dissolve the friendship

Table 2: Choosing competition over the four treatments

	No-Ties		Future-Prospect		Weak-Ties		Weak-Ties w/Future-Prospect	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Δ *closeness high*	0.017	0.024	0.015	0.041	-0.036	-0.021	-0.255***	-0.238**
	(0.108)	(0.113)	(0.117)	(0.122)	(0.062)	(0.068)	(0.094)	(0.094)
Closeness before		0.011		0.045		0.020		0.025
Chat I		(0.048)		(0.040)		(0.036)		(0.030)
Male		0.125		0.117		0.024		0.025
		(0.094)		(0.105)		(0.085)		(0.083)
Constant	0.343***	0.276**	0.446***	0.298**	0.385***	0.328**	0.500***	0.434***
	(0.050)	(0.125)	(0.064)	(0.105)	(0.051)	(0.116)	(0.071)	(0.093)
Obs.	117	117	108	108	108	108	113	113
Clusters	13	13	12	12	12	12	38	38
R^2	0.000	0.017	0.000	0.041	0.001	0.004	0.069	0.074

Notes: OLS regressions on choosing competition. Columns (1) and (2) contain data for the *No-Ties* treatment, columns (3) and (4) contain data for the *Future-Prospect* treatment, columns (5) and (6) contain data for the *Weak-Ties* treatment, and columns (7) and (8) contain data for the *Weak-Ties w/Future-Prospect* treatment. Δ *closeness high* has a value of 1 if Δ closeness is above the median, and 0 otherwise. *Closeness before Chat I* depicts the average level of closeness indicated on the IOS scale before Chat I. *Male* is a gender dummy. Std. errors clustered at the matching group level and depicted in parentheses. ***(**/*) significant at the 1% (5%/10%) level.

after the experiment in these cases, the data cannot elucidate the driving factors behind our finding.

3.2 Weak-Ties w/Future-Prospect Compared to Weak-Ties

If the connection between closeness and willingness to compete in the *Weak-Ties w/Future-Prospect* treatment is solely driven by the effect of existing social ties, we would expect to find the same pattern in the *Weak-Ties* treatment. In the *Weak-Ties w/Future-Prospect* treatment, subjects know that they will stay in the same group composition in Chat II, while in the *Weak-Ties* treatment, they are informed that they will not interact within the same group after the Task stage.

We show that weak ties are not sufficient to reduce willingness to compete. Figures 4a, 4c and 4d plot the shares of subjects choosing competition in the *No-Ties*, *Weak-Ties* and *Weak-Ties w/Future-Prospect* treatments split by whether the subjects increased their closeness above median or not in Chat I. As outlined in the previous subsection, there seems to be only an insignificant effect of closeness on the willingness to compete in the *No-Ties* and the *Weak-Ties* treatments. However, this difference is quite large in the *Weak-Ties w/Future-Prospect* treatment. Columns (1) to (3) of Table 3 report the regression results of the difference in the effect of closeness between the *No-Ties* and the *Weak-Ties w/Future-Prospect* treatment. The regressions show that subjects with Δ *closeness low* increase their willingness to compete when in the *Weak-Ties w/Future-Prospect* treatment. For those with Δ *closeness high*, however, the share choosing competition is (weakly) significantly lower.

Columns (4) to (6) of Table 3 report the regression results of the difference of the influence in closeness on competition choice in the case of *Weak-Ties w/Future-Prospect* and *Weak-Ties*. The influence of increased closeness to the potential competitors on competition choice in the *Weak-Ties*

treatment is (weakly) significantly lower than in the *Weak-Ties w/Future-Prospect* treatment. As the treatment difference came into play after subjects filled out the IOS scale that we used to calculate the change in closeness, this comparison in the effect of *closeness* between *Weak-Ties* and *Weak-Ties w/Future-Prospect* can be considered causal.

Table 3: Probability of choosing competition

	Treatment Weak-Ties w/Future-Prospect and Treatment No-Ties			Treatment Weak-Ties w/Future-Prospect and Treatment Weak-Ties		
	(1)	(2)	(3)	(4)	(5)	(6)
Δ *closeness high*	0.017	0.025	0.026	-0.036	-0.021	-0.019
	(0.105)	(0.110)	(0.108)	(0.060)	(0.061)	(0.062)
Weak-Ties w/Future-Pr.	0.157*	0.156*	0.149*	0.115	0.119	0.118
	(0.086)	(0.087)	(0.088)	(0.086)	(0.087)	(0.086)
Δ *closeness high*	-0.271*	-0.268*	-0.263*	-0.219*	-0.221*	-0.220*
$\times$ *Weak-Ties w/Future-Pr.*	(0.141)	(0.142)	(0.140)	(0.111)	(0.111)	(0.112)
Closeness before		0.022	0.018		0.022	0.022
Chat I		(0.027)	(0.027)		(0.022)	(0.022)
Male			0.073			0.025
			(0.063)			(0.058)
Constant	0.343***	0.295***	0.277***	0.385***	0.331***	0.322***
	(0.049)	(0.084)	(0.082)	(0.049)	(0.077)	(0.079)
Obs.	230	230	230	221	221	221
Clusters	51	51	51	50	50	50
R^2	0.035	0.039	0.044	0.036	0.039	0.040

Notes: OLS regression on choosing competition. Data for the *No-Ties* and the *Weak-Ties w/Future-Prospect* treatment included in columns (1) to (3). Data for the *Weak-Ties* and the *Weak-Ties w/Future-Prospect* treatment included in columns (4) to (6). Δ *closeness high* has a value of 1 if Δ closeness is above the median, and 0 otherwise. *Weak-Ties w/Future-Prospect* is a dummy variable that has the value 1 if the *Weak-Ties w/Future-Prospect* treatment is played and 0 if the *Weak-Ties* or the *No-Ties* treatment is played. *Closeness before Chat I* depicts the average level of closeness indicated on the IOS scale before Chat I. Std. errors are clustered at the matching group level and depicted in parentheses. ***(**/*) significant at the 1% (5%/10%) level.

This result is not affected by adding further controls – initial closeness, gender, cognitive abilities – to the regression. To show that potential differences in the initial level of closeness do not matter for the result (as we investigate the influence of the change in closeness through Chat I), we include the answer to the IOS scale before Chat I in the regression of column (5). As gender is not perfectly balanced among treatments, and as previous literature has shown that gender influences the willingness to compete, we control for gender in column (6). Adding further control variables does not affect the result and strengthens our argument that potentially non-random treatment allocations cannot explain the effect of interest (See Table A.1).[12] Section 3.3 shows that the finding is also

[12]Depth of reasoning and (over-)confidence might also explain the willingness to compete, so we include our incentivized measures of cognitive reflection, the incentivized belief about the performance in the CRT, as well as the incentivized belief about performance of others in the test. The CRT measure consists of answering seven questions that need some understanding of complex reasoning. As argued in Toplak et al. (2014), performance in such a task serves as a proxy for intelligence and executive functioning. The questions can be found in the screenshots C.23 to C.29. Table A.1 also includes the non-incentivized Big 5 personality trait measures (Gosling et al., 2003). The results

robust to a more detailed measure of closeness instead of the binary measure used in this Section 3.

3.3 Robustness Checks

The regression results presented in Sections 3.1 and 3.2 use median splits for the change in closeness. A potential concern is the sensitivity of the results to the specific definition of closeness that we use. To address this, we conduct various tests to assess the robustness of our findings. First, we visually investigate the robustness of our result for different thresholds. Figure A.3 illustrates that, while the number of observations with high closeness change decreases as the threshold increases, the overall trend remains consistent: the disparity in the share of subjects opting for competition between low closeness changes and high closeness changes is most pronounced in the *Weak-Ties w/Future-Prospect* treatment. Second, in Table A.2 we abstract from the median split and re-estimate Table 2 using the continuous closeness variable. We also show results for the differential effect of closeness between the *Weak-Ties w/Future-Prospect* and *Weak-Ties* treatment in Table A.3. Our conclusions remain unchanged.

Another concern might arise from subjects reporting exceptionally high initial closeness, possibly leading to a ceiling effect. Although we control for the initial level of closeness in Sections 3.1 and 3.2, we conduct a robustness check by excluding subjects reporting an initial closeness above 4.5. Excluding these subjects does not change the results qualitatively (see Table A.4 and Table A.5).

So far, we have defined closeness based on the average levels of closeness reported toward both other subjects on the IOS scale before and after Chat I. However, when deciding whether to compete, subjects are unaware of the specific choices made by each potential competitor in the group. Given that the potential competitors can be one or both of the other group members, the relevant metric for closeness appears to be the average of the closeness to each individual in the group. Gächter et al. (2023) also look at closeness within a group via the IOS scale. They define closeness as the weakest link among all the links in the group. To see how far our results are robust to different definitions of closeness, we rerun the regressions and instead of using the average closeness toward both subjects, we use the i) *lower value of closeness* and ii) *higher value of closeness*. Table A.6 shows that the main result is qualitatively unaffected, even though the estimated coefficients are slightly smaller. To further investigate this issue, we distinguish between subjects reporting a similar closeness change to both group members and those reporting varying closeness changes toward the other group members. We classify closeness changes between the two subjects as similar if the difference in relation to both other group members is within one point on the 7-point scale. We find that our results are mostly driven by subjects with similar closeness changes in relation to both group members (see Table A.7 and Table A.8).

With our design, we chose a setting where choosing to compete did not impose externalities on

show that among the Big 5, only the level of conscientiousness significantly correlates with the choice to compete in these two treatments.

other players. Subjects could opt into the competition, but they had no means to compel others to compete against them. If a subject knew that the other two group members had decided not to compete, they would be indifferent between competing and playing individually, as competition without an opponent would be equivalent to the individual incentive scheme in our design. To detect indifference, subjects were asked to rate, on a scale from 1 to 6, how likely they thought it was that each of the two other subjects would choose to compete (non-incentivized). We find that across all treatments, subjects were not indifferent between choosing competition and playing alone (Figure B.1). For further details on belief formation and the accuracy of beliefs, the interested reader is referred to Appendix B.

4 Further Results

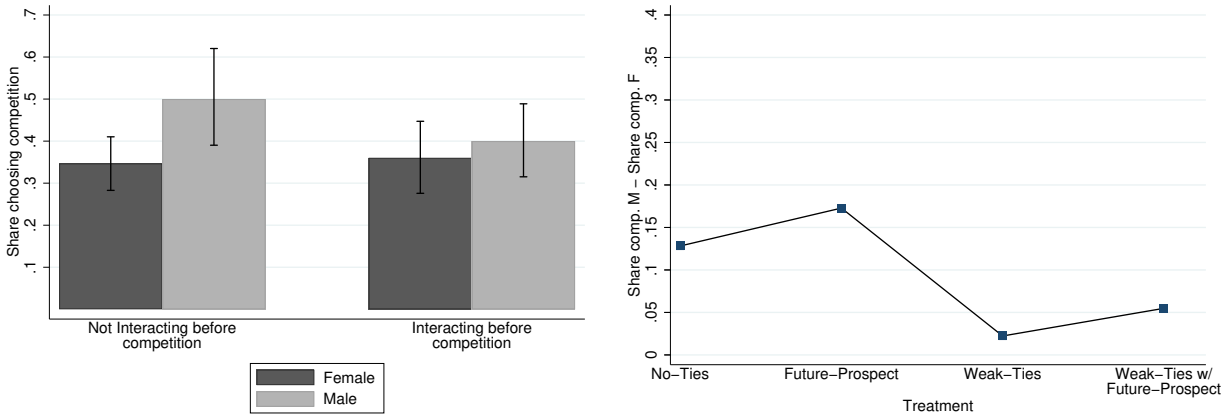
4.1 The Role of Gender

Following the seminal work by Niederle and Vesterlund (2007), a vast literature has documented a substantial gender difference in preferences for competition. In the classical design, strangers can choose whether to compete in solving mathematical tasks. Building on this, recent studies investigate how social and environmental factors influence the observed gender gap. In a recent meta-analysis, Markowsky and Beblo (2022) find a negligible gender gap in competition choices for verbal tasks. Hanek et al. (2016) explores the impact of competition size, while Ifcher and Zarghamee (2016) examines the role of performance measures in observing gender differences. Our study contributes by relaxing a critical assumption in previous lab results, i.e., the social ties between subjects. By varying whether potential competitors are random strangers or individuals with prior interactions, and whether further interactions follow potential competition, our data can enhance the understanding of the environmental factors that mitigate the gender gap in preferences for competition.

For each treatment $i \in \{$*No-Ties*, *Future-Prospect*, *Weak-Ties*, *Weak-Ties w/Future-Prospect*$\}$ and gender $j \in \{M, F\}$, we denote the share of subjects choosing competition as x_i^j. The difference in shares between male and female participants is denoted as $y_i = x_i^M - x_i^F$.[13] Figure 5a shows an interesting pattern. For the *Not interacting before competition* treatments, we find a significant gender difference in preferences for competition. This is in line with the previous literature. However, this is not the case in the *Interacting before competition* treatments.[14] This is in line with our pre-registered hypothesis. The difference in gender differences between the *Not interacting before competition* and *Interacting before competition* treatments, however, is not statistically significant (p-value: 0.175). Figure 5b plots the differences for each treatment. The figure shows that the results in Figure 5a are not driven by one particular treatment. It also shows that meeting after the competition does not affect the gender difference in preferences for competition in any meaningful way.

[13] In a pre-analysis plan (AEARCTR-0007319), we originally hypothesized a difference in gender difference in preference for competition for varying possibilities of forming social ties ($y_{No-Ties} \neq y_{Weak-Ties}$; $y_{No-Ties} \neq y_{Future-Prospect}$; $y_{No-Ties}, y_{Weak-Ties}, y_{Future-Prospect} \neq y_{Weak-Tiesw/Future-Prospect}$).

[14] *Not interacting before competition* combines the treatments No-Ties and Future-Prospect, while *Interacting before competition* combines the treatments Weak-Ties and Weak-Ties w/Future-Prospect.



(a) Comparison between treatments with known and unknown competitors

(b) gender difference in competition among all treatments

Figure 5: Gender and choice to compete in different treatments

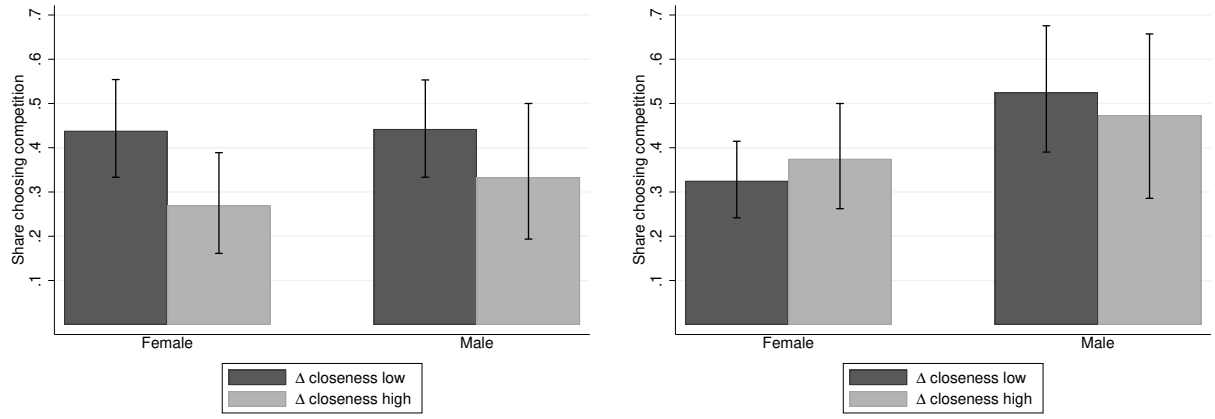
Notes: The difference between male and female subjects choosing competition for each treatment. Panel (a) combines treatments where the potential competitors are (not) known via Chat I. (b) plots the gender difference in the share of competition for each treatment. Whiskers represent the 95% confidence intervals.

In the same way as in Section 3, we now extend our analysis by adding the closeness dimension. We provide three main results. First, we separately investigate the responses of male and female subjects to closeness. In Figure 6, we show the difference in preferences for competition between subjects that report low changes in closeness and subjects that report high changes in closeness, separately for both genders. In the *Not interacting before competition* treatments, neither male nor female subjects show any difference in preferences for competition between both groups (Panel 6b). In the *Interacting before competition* treatments, we find a significant difference between the groups for female participants, while the effect for male participants is also negative, but is smaller (Panel 6a). Second, the within-gender change in preferences for competition across treatments is also significant for females (p-value = 0.07), while it is insignificant for males. Third, the decreased gender difference in preferences for competition observed in Figure 5 is attributable to a decrease in willingness to compete for male subjects. We also show that our main result from the previous section, the decrease in competition choice as a response to meeting after the competition, is not a gender-driven effect (see Figure A.2).

4.2 Increasing Closeness Through Chat I

The chat affects closeness. To explore whether the endogenous content of Chat I correlates with the change in closeness, we combine the data from all treatments to test and validate the induced social ties via the Chat I stage (as the elicitation after Chat I was conducted before the treatment differences were announced). We classified the conversations in each chat on multiple dimensions.[15] Table A.9 reports the results and shows that the change in closeness positively correlates with answering the questions proposed by Aron et al. (1997). So do other chat content dimensions such

[15]Two research assistants, unaware of the treatment difference or any focus of the project, classified Chat I on various dimensions. We use the average report of both research assistants for each dimension we report in Table A.9.



(a) Interacting before competition (*Weak-Ties w/Future-Prospect* and *Weak-Ties*)

(b) Not interacting before competition (*No-Ties* and *Future-Prospect*)

Figure 6: Choice to compete in different treatments, split by gender of the participant.

Notes: Panel (a) plots the share of males and females choosing competition in the treatments where the potential competitors are not known from Chat I. Panel (b) plots the share of males and females choosing competition in the treatments where the potential competitors are known from Chat I. Δ *closeness high* (Δ *closeness low*) depicts whether Δ closeness is above (or below) the median. Whiskers represent the 95% confidence intervals.

as positive sentiment, positive emotions, lack of negative emotions, and expression of agreement. Overall, these results confirm that the chat induced reasonable variation in closeness between subjects.

While the chat content correlates with closeness formation, we do not find that subjects' personality affects closeness. To get a better understanding of the predictors of closeness formation, Table 4 reports the results of OLS regressions of correlates of the change in closeness across all treatments. The OLS regression in column (1) shows that the chat increases the stated closeness by 1.22 units on the 7-point IOS scale, which significantly differs from zero. The regression analyses in Table 4 further reveal that the intensity of the chat positively correlates with the increase in closeness to the other two group members of the chat. Looking at the effect of the answers in the Big 5 questionnaire taken from Gosling et al. (2003), we can see in column (3) of Table 4 that individuals who score higher on *Agreeableness* increase the stated closeness to the two others in Chat I significantly more. Including the stated closeness before Chat I as a control removes the significant correlation with the Big 5 measures. The personality traits of the other group members do not seem to have an impact on the increase in closeness. Regressing the other's person personality traits on the change in closeness to this person renders only insignificant results (as shown in Table A.10 in the Appendix).

Table 4: Change in closeness through Chat I and Big 5 personality traits

	Δ Closeness			
	(1)	(2)	(3)	(4)
Male		-0.187	0.004	
		(0.136)	(0.138)	
# Messages of others		0.016	0.019*	
		(0.011)	(0.010)	
# Messages of oneself		0.038**	0.038**	
		(0.017)	(0.016)	
Agreeableness (Big 5)			0.124**	0.088
			(0.062)	(0.059)
Conscientiousness (Big 5)			0.051	0.007
			(0.055)	(0.051)
Extraversion (Big 5)			0.022	0.021
			(0.047)	(0.047)
Openess (Big 5)			-0.070	-0.049
			(0.061)	(0.056)
Emotionalstability (Big 5)			-0.022	0.018
			(0.050)	(0.053)
Closeness before Chat I				-0.413***
				(0.051)
Constant	1.220***	0.484*	0.671	0.803
	(0.075)	(0.266)	(0.492)	(0.513)
Obs.	446	446	443	443
Clusters	149	149	149	149
R^2	0.000	0.034	0.014	0.199

Notes: OLS regression of the difference in stated closeness to the two other group members after and before Chat I. *# Messages of others* counts the number of messages sent by the other two group members in Chat I. *# Messages of oneself* refers to the number of messages sent in Chat I by the respective individual. All Big 5 traits are coded $\in (1, 7)$ and measured via the short Big 5 questionnaire (Gosling et al., 2003). Standard errors (in parentheses) are clustered at the Chat-I-group level. ***(**/*) significant at the 1% (5%/10%) level.

4.3 Performance in the Task

In addition to the choice of whether to compete, the experimental design also allows us to examine another outcome variable: the subjects' performance in the Task stage. In this stage, participants were tasked with solving a letter grid, requiring them to identify three hidden words within a 10x10 letter matrix. We chose this task for several reasons. First, traditional tasks like number-adding were unsuitable for our online experiment conducted via zTree unleashed, as we could not reliably prevent subjects from using external tools. Trivia questions also presented challenges, given the difficulty in restricting subjects' access to online search engines. By contrast, the letter grid task, minimized opportunities for cheating. Second, we aimed to avoid strong correlations between performance and gender stereotypes or traits easily discernible through the chat. The time spent on examples (average of 14.03 seconds) and the number of times examples were viewed (average of 1.08 times) indicate that the task was generally easy to comprehend. Across treatments, there were no significant differences in these numbers ($p > 0.1$ for all comparisons). Table A.11 in the Appendix demonstrates that neither the total time nor the frequency of viewing examples correlates with the choice to compete. Additionally, the time taken to solve the task does not correlate with the time or frequency of viewing examples.

Table 5: Performance in letter grid task: Time needed to solve

	All subjects				Subjects who chose to compete			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Competition	-6.003		-7.511	-8.431				
	(8.226)		(8.193)	(8.188)				
Male		-8.332	2.055	1.764	7.673	7.342	23.615*	23.086
		(8.381)	(8.915)	(8.923)	(13.035)	(13.049)	(13.794)	(13.981)
Δ *closeness*			-1.391	-0.068		2.120	2.512	3.132
			(2.904)	(3.083)		(4.575)	(4.466)	(4.726)
Born in Germany			-3.029	-1.294				
			(15.154)	(15.161)				
CRT			-7.223***	-7.161***			-10.369***	-10.243***
			(2.137)	(2.135)			(3.403)	(3.437)
Constant	96.748***	97.726***	123.408***	127.437***	93.835***	95.875***	123.114***	127.080***
	(9.373)	(9.424)	(18.257)	(20.065)	(15.333)	(15.948)	(17.981)	(22.471)
Obs.	446	446	443	443	173	173	173	173
Letter grid F.E.	yes	yes	yes	yes	yes	yes	yes	yes
Treatment F.E.	no	no	no	yes	no	no	no	yes

Notes: Tobit regressions. Dependent variable is the number of seconds needed to solve the letter grid task. The number is capped at 200 seconds. Columns (1) - (4) contain data of all subjects. Columns (5) - (8) contain data for the sub-sample of subjects who chose competition. *Competition* is a dummy variable with a value of 1 if the subject played the task in competition. Δ *closeness* depicts the change in average closeness through Chat I. *CRT* represents the number of correctly answered questions in the CRT ($\in \{0, 1, .., 7\}$). *born in Germany* is a dummy variable that equals 1 if the subject indicated being born in Germany in the post-experimental questionnaire. One of four letter grids was randomly chosen to be played in a session. Fixed effects for the letter grid that was played are included in all columns, and columns (4) and (8) also contain treatment fixed effects.
***(**/*) significant at the 1% (5%/10%) level.

In Table 5, we show the results of regressions using the number of seconds needed to solve the task as dependent variable. One of four letter grids was randomly selected at the session level. We included letter-grid fixed effects in the regressions to account for varying difficulty. The regressions

in Table 5 reveal a strong relationship between cognitive reflection, measured by the 7-item CRT (Toplak et al., 2014), and performance. Subjects with higher CRT scores exhibit significantly better performance in the letter grid task. As the task required finding three German words in the letter grid, we also included a dummy variable indicating whether the participant was born in Germany. The regressions indicate no significant effect. Columns (1), (3), and (4) further regress performance on the choice to compete. If better-performing subjects choose competition more frequently, or if choosing competition leads to better performance in the task, we would expect a negative coefficient. Although the coefficient's sign is negative, the standard errors indicate that this correlation is not statistically significant. Given our incentive structure, one might speculate that participants who feel very close to other group members choose competition and intentionally perform poorly to boost the other players' payoffs. However, the small and close-to-zero coefficient for the change in the closeness variable suggests that this motivation is not an important factor in our setting.

5 Discussion and Conclusion

We study the relationship between social ties and individuals' willingness to compete. Anecdotal evidence suggests that individuals are less willing to compete against their friends. We conducted an experiment to (i) test whether there is a causal relationship between social ties and willingness to compete and (ii) understand the underlying mechanisms behind the effect to extract relevant implications for designing workplace policies.

Most studies on individuals' willingness to compete have been conducted in a laboratory setting, involving anonymous agents. Since real-world interactions often occur between individuals who know each other and/or frequently interact with each other, complete anonymity is a strong assumption. Furthermore, several studies have shown that relaxing the anonymity assumption affects social decision-making in a meaningful way (e.g. Bohnet and Frey, 1999). We use an experimental design tailored to manipulate social ties between individuals. In contrast to the previous literature, we design our experiment to allow us to isolate two important mechanisms behind the effect of social ties. Following the seminal study by Granovetter (1973), we differentiate between the reduced social distance between agents and repeatedly interacting with each other.

We compare individuals' willingness to compete across four treatments. We find that individuals who develop social closeness and anticipate future interactions exhibit a reduced willingness to compete with one another, compared to anonymous individuals. We establish that this effect cannot be attributed solely to existing social ties or solely to a future prospect of meeting again. Rather, the future prospect, coupled with existing weak ties, reduce the willingness to compete. Strategic monetary considerations do not drive this effect since the interaction after the competition is unincentivized. We also rule out ambiguity aversion to explain the effect since the potential competitors are known in both settings (*Weak-Ties* as well as *Weak-Ties w/Future-Prospect*). We further find that reduced social distance can be associated with a decrease in the gender gap in the willingness to compete. This finding is in line with several studies from the social cognition literature that provide evidence showing that social connections affect gender differences in preference for competition (Costa Jr et al., 2001; Chapman et al., 2007; Schulte-Rüther et al., 2008; Weisberg

et al., 2011; Friebel et al., 2021).

Our results have important implications for managers seeking to design efficient workplace policies. Social ties can be used in at least two ways. On the one hand, company policies can be tailored to strengthen social ties among co-workers, e.g., via team events, office policies, and remote work that seeks to influence social ties among co-workers (Yang et al., 2022). This can lead to less competitive behavior between employees. On the other hand, company policies are often set to prevent promoted workers obtaining leadership positions in the teams with which they have formed social ties (Benson et al., 2019). This can lead to more competitive behavior among employees in promotion tournaments.

Our results also contribute to a broader understanding of how social ties affect economic decision-making (Buser et al., 2014, among others). Social ties matter for social decision-making by affecting how much individuals care about others' behavior and well-being (Uzzi, 1999; Akerlof, 1997). So far, the importance of social ties for economic behavior has been shown, for example, in the context of cooperation (Apicella et al., 2012; Harrison et al., 2011), trust and trustworthiness (Abbink et al., 2006), and norm enforcement (Goette et al., 2012). We add willingness to compete as an outcome variable to this literature.

In addition, our results also add nuance to the various definitions of social ties and related concepts used in the literature. For example, we acknowledge that our approach to inducing social ties using the question-based methodology proposed by Aron et al. (1997) notably differs from the approach taken by Cornaglia et al. (2019), who use the minimal group paradigm and task to guide the chat. Furthermore, our approach, which includes the future prospect of chatting again after the competition, differs from the approach taken by Cornaglia et al. (2019), who use a single chat round. This may explain the discrepancies in the results. The discrepancy may arise because minimal groups hinge on similarity, whereas our approach to inducing social ties does not inherently imply greater similarity among closer participants. The discrepancy in findings may also arise due to the element of group identity, which is excluded in our design. Our studies in combination thus provide complementary insights into the ways social dynamics shape decision-making in such a context.

Our findings point to exciting new avenues for future research. Several studies suggest that competitive incentive schemes can have adverse effects. We suggest that social ties can be a way to mitigate this effect, by reducing preferences for competition. However, future research could seek to test this directly, by investigating whether social ties reduce the chances of engaging in sabotage behavior, which is welfare-harming, different from our zero-sum competition. Another promising avenue would be to explore whether a causal relationship also exists the other way around: from a given incentive structure to endogenous tie formation. Several studies point to the importance of social networks for career success. If competitive incentive structures impact social tie formation, this could also have practical implications for designing workplace policies.

Statements and Declarations

All authors declare that they have no conflicts of interest.

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A Further Experimental Results

Table A.1: Probability of choosing competition

	Treatment Weak-Ties w/Future-Prospect and Treatment Weak-Ties							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Δ *closeness high*	-0.036	-0.021	-0.019	-0.019	-0.021	-0.021	-0.020	-0.006
	(0.060)	(0.061)	(0.062)	(0.063)	(0.064)	(0.064)	(0.064)	(0.070)
Weak-Ties w/Future-Prospect	0.115	0.119	0.118	0.118	0.118	0.116	0.113	0.110
	(0.086)	(0.087)	(0.086)	(0.086)	(0.087)	(0.087)	(0.090)	(0.089)
Δ *closeness high*	-0.219*	-0.221*	-0.220*	-0.221*	-0.221*	-0.224*	-0.221*	-0.209*
× *Weak-Ties w/Future-Prospect*	(0.111)	(0.111)	(0.112)	(0.113)	(0.113)	(0.114)	(0.115)	(0.119)
Closeness before		0.022	0.022	0.022	0.022	0.022	0.022	0.018
Chat I		(0.022)	(0.022)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
Male			0.025	0.026	0.031	0.034	0.031	-0.029
			(0.058)	(0.063)	(0.065)	(0.065)	(0.064)	(0.072)
CRT				-0.001	0.006	0.005	0.005	0.001
				(0.015)	(0.020)	(0.020)	(0.021)	(0.021)
Belief own CRT					-0.014	-0.005	-0.008	-0.001
					(0.027)	(0.030)	(0.034)	(0.033)
Belief others CRT						-0.031	-0.030	-0.025
						(0.052)	(0.051)	(0.051)
Number boxes opened							0.004	0.002
(risk-loving)							(0.009)	(0.009)
Extraversion (Big 5)								0.000
								(0.024)
Neuroticism (Big 5)								0.020
								(0.025)
Openness (Big 5)								-0.009
								(0.025)
Agreeableness (Big 5)								-0.035
								(0.034)
Conscientiousness (Big 5)								-0.046**
								(0.022)
Constant	0.385***	0.331***	0.322***	0.324***	0.366**	0.459**	0.426**	0.804***
	(0.049)	(0.077)	(0.079)	(0.081)	(0.137)	(0.215)	(0.199)	(0.299)
Obs.	221	221	221	221	221	221	221	221
Clusters	50	50	50	50	50	50	50	50
R^2	0.036	0.039	0.040	0.040	0.041	0.043	0.044	0.068

Notes: OLS regression on choosing competition. Data for the *Weak-Ties* and the *Weak-Ties w/Future-Prospect* treatment included. Δ *closeness high* has a value of 1 if Δ closeness is above the median, and 0 otherwise. *Weak-Ties w/Future-Prospect* is a dummy variable that has the value 1 if the *Weak-Ties w/Future-Prospect* treatment is played and 0 if the *Weak-Ties* treatment is played. *Closeness before Chat I* depicts the average level of closeness indicated on the IOS scale before Chat I. *Boxes opened* $\in \{0, 1, ..., 25\}$ represents the number of boxes opened in the bomb-task to measure risk-loving behavior. *CRT* is measured on a scale from 0 to 7 and depicts the number of correct answers in the Cognitive Reflection Test. *Belief CRT of others* is measured on a scale from 0 to 7 and depicts the incentivized belief about the average number of correct answers of the other subjects in the session in the CRT. All Big 5 traits are values $\in (1, 7)$ and measured via the short Big 5 questionnaire (Gosling et al., 2003). Std. errors clustered at the matching group level and depicted in parentheses. ***(**/*) significant at the 1% (5%/10%) level.

Table A.2: Choosing competition in different treatments - continuous closeness measure

	No-Ties		Future-Prospect		Weak-Ties		Weak-Ties w/Future-Pr.	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Δ *closeness*	-0.036	-0.038	0.007	0.039	-0.024	-0.017	-0.095***	-0.089**
	(0.033)	(0.035)	(0.040)	(0.046)	(0.021)	(0.026)	(0.033)	(0.034)
Closeness before Chat I		-0.008		0.059		0.015		0.017
		(0.048)		(0.045)		(0.039)		(0.033)
Male		0.129		0.117		0.022		0.004
		(0.093)		(0.106)		(0.082)		(0.087)
Constant	0.393***	0.369***	0.444***	0.238	0.398***	0.350**	0.500***	0.458***
	(0.048)	(0.118)	(0.071)	(0.136)	(0.045)	(0.119)	(0.075)	(0.104)
Obs.	117	117	108	108	108	108	113	113
Clusters	13	13	12	12	12	12	38	38
R^2	0.013	0.029	0.000	0.050	0.004	0.005	0.066	0.068

Notes: OLS regressions on choosing competition. Columns (1) and (2) contain data for the *No-Ties* treatment, columns (3) and (4) contain data for the *Future-Prospect* treatment, columns (5) and (6) contain data for the *Weak-Ties* treatment, and columns (7) and (8) contain data for the *Weak-Ties w/Future-Prospect* treatment. Δ *closeness* is a continuous measure and depicts the change in closeness through Chat I. *Closeness before Chat I* depicts the average level of closeness indicated on the IOS scale before Chat I. *Male* is a gender dummy. Std. errors clustered at the matching group level and depicted in parentheses. ***(**/*) significant at the 1% (5%/10%) level.

Table A.3: Probability of choosing competition - continuous closeness measure

	Treatment Weak-Ties w/Future-Prospect and Treatment Weak-Ties		
	(1)	(2)	(3)
Δ *closeness*	-0.024	-0.017	-0.016
	(0.021)	(0.023)	(0.023)
Weak-Ties w/Future-Prospect	0.102	0.106	0.105
	(0.087)	(0.087)	(0.088)
Δ *closeness*	-0.071*	-0.073*	-0.072*
× *Weak-Ties w/Future-Prospect*	(0.039)	(0.040)	(0.040)
Closeness before Chat I		0.016	0.016
		(0.025)	(0.025)
Male			0.013
			(0.058)
Constant	0.398***	0.356***	0.351***
	(0.044)	(0.080)	(0.079)
Obs.	221	221	221
Clusters	50	50	50
R^2	0.036	0.037	0.038

Notes: OLS regression on choosing competition. Data of the *Weak-Ties* and the *Weak-Ties w/Future-Prospect* treatment included. Δ *closeness* depicts the change in closeness through Chat I. *Weak-Ties w/Future-Prospect* is a dummy variable that has the value 1 if the *Weak-Ties w/Future-Prospect* treatment is played and 0 if the *Weak-Ties* treatment is played. *Closeness before Chat I* depicts the average level of closeness indicated on the IOS scale before Chat I. Std. errors clustered at the matching group level and depicted in parentheses. ***(**/*) significant at the 1% (5%/10%) level.

Table A.4: Choosing competition in different treatments - initial closeness ≤ 4.5

	No-Ties		Future-Prospect		Weak-Ties		Weak-Ties w/Future-Pr.	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Δ *closeness high*	0.037	0.035	0.059	0.064	-0.028	-0.020	-0.223**	-0.218**
	(0.103)	(0.108)	(0.125)	(0.114)	(0.063)	(0.069)	(0.095)	(0.094)
Closeness before Chat I		-0.013		0.045		0.016		0.001
		(0.041)		(0.043)		(0.041)		(0.042)
Male		0.128		0.134		0.004		0.037
		(0.094)		(0.105)		(0.082)		(0.090)
Constant	0.323***	0.308**	0.412***	0.280**	0.377***	0.341**	0.473***	0.454***
	(0.050)	(0.117)	(0.074)	(0.105)	(0.055)	(0.114)	(0.069)	(0.102)
Obs.	115	115	102	102	104	104	107	107
Clusters	13	13	12	12	12	12	38	38
R^2	0.001	0.018	0.004	0.038	0.001	0.002	0.053	0.055

Notes: OLS regressions on choosing competition. Columns (1) and (2) contain data for the *No-Ties* treatment, columns (3) and (4) contain data for the *Future-Prospect* treatment, columns (5) and (6) contain data for the *Weak-Ties* treatment, and columns (7) and (8) contain data for the *Weak-Ties w/Future-Prospect* treatment. Δ *closeness high* has a value of 1 if Δ closeness is above the median, and 0 otherwise. *Closeness before Chat I* depicts the average level of closeness indicated on the IOS scale before Chat I. *Male* is a gender dummy. The sample is restricted to subjects that report a lower or equal initial closeness than 4.5. Std. errors clustered at the matching group level and depicted in parentheses. ***(**/*) significant at the 1% (5%/10%) level.

Table A.5: Probability of choosing competition - initial closeness ≤ 4.5

	Treatment Weak-Ties w/Future-Prospect and Treatment Weak-Ties		
	(1)	(2)	(3)
Δ *closeness high*	-0.028	-0.023	-0.022
	(0.061)	(0.063)	(0.064)
Weak-Ties w/Future-Prospect	0.096	0.098	0.097
	(0.087)	(0.088)	(0.087)
High diff. closeness	-0.195*	-0.196*	-0.195*
$\times$ *Weak-Ties w/Future-Prospect*	(0.113)	(0.114)	(0.114)
Closeness before Chat I		0.010	0.009
		(0.028)	(0.029)
Male			0.019
			(0.060)
Constant	0.377***	0.355***	0.349***
	(0.053)	(0.084)	(0.085)
Obs.	211	211	211
Clusters	50	50	50
R^2	0.028	0.028	0.028

Notes: OLS regression on choosing competition. Data for the *Weak-Ties* and the *Weak-Ties w/Future-Prospect* treatment included. *diff. closeness* is the average change in closeness reported to both other subjects. *Weak-Ties w/Future-Prospect* is a dummy variable that has the value 1 if the *Weak-Ties w/Future-Prospect* Treatment is played and 0 if the *Weak-Ties* treatment is played. Δ *closeness high* has a value of 1 if Δ closeness is above the median, and 0 otherwise. *Closeness before Chat I* depicts the average level of closeness indicated on the IOS scale before Chat I. The sample is restricted to subjects that report a equal or lower initial closeness than 4.5. Std. errors clustered at the matching group level and depicted in parentheses. ***(**/*) significant at the 1% (5%/10%) level.

Table A.6: Competition Choice and minimum/maximum difference in closeness

	No-Ties		Future-Prospect		Weak-Ties		Weak-Ties w/Future-Pr.	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Min Δ *closeness*	-0.041		0.032		-0.016		-0.065**	
	(0.031)		(0.036)		(0.027)		(0.031)	
Closeness before Chat I	-0.018	0.004	0.061	0.047	0.012	0.020	0.013	0.035
	(0.045)	(0.048)	(0.044)	(0.042)	(0.039)	(0.037)	(0.036)	(0.034)
Male	0.136	0.124	0.116	0.122	0.021	0.024	0.009	0.020
	(0.098)	(0.092)	(0.105)	(0.105)	(0.080)	(0.085)	(0.086)	(0.090)
Max Δ *closeness*		-0.019		0.027		-0.009		-0.065**
		(0.032)		(0.040)		(0.023)		(0.030)
Constant	0.369***	0.332**	0.262**	0.258*	0.348***	0.334**	0.400***	0.418***
	(0.101)	(0.131)	(0.108)	(0.140)	(0.107)	(0.126)	(0.095)	(0.108)
Obs.	117	117	108	108	108	108	113	113
Clusters	39	39	36	36	36	36	38	38
R^2	0.035	0.020	0.049	0.046	0.006	0.004	0.054	0.054

Notes: OLS regression on choosing competition. Columns (1) and (2) contain data for the *No-Ties* treatment. Columns (3) and (4) contain data for the *Future-Prospect* treatment. Columns (5) and (6) contain data for the *Weak-Ties* treatment. Columns (7) and (8) contain data for the *Weak-Ties w/Future-Pr.* treatment. *Min* Δ *closeness* represents the minimum of the difference in closeness to each of the other two group members between directly after and directly before Chat I. *Max* Δ *closeness* represents the maximum of the difference in closeness to each of the other two group members between directly after and directly before Chat I. Std. errors clustered at the level of Chat I groups and depicted in parentheses. ***(**/*) significant at the 1% (5%/10%) level.

Table A.7: Competition Choice for heterogeneous and homogeneous closeness changes

	No-Ties		Future-Prospect		Weak-Ties		Weak-Ties w/Future-Pr.	
	homog.	heterog.	homog.	heterog.	homog.	heterog.	homog.	heterog.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Δ *closeness*	-0.027	0.183	0.076	-0.062	0.052	-0.180	-0.260**	-0.098
	(0.094)	(0.249)	(0.138)	(0.227)	(0.119)	(0.288)	(0.103)	(0.279)
Closeness before Chat I	-0.014	0.089	0.002	0.083	-0.037	0.089	0.012	0.071
	(0.048)	(0.068)	(0.051)	(0.066)	(0.036)	(0.058)	(0.033)	(0.076)
Male	0.185	-0.089	0.276	-0.098	0.053	-0.044	0.012	0.036
	(0.129)	(0.208)	(0.193)	(0.134)	(0.113)	(0.168)	(0.100)	(0.181)
Constant	0.320**	0.053	0.295**	0.356	0.391***	0.245	0.461***	0.282
	(0.116)	(0.210)	(0.112)	(0.233)	(0.118)	(0.231)	(0.103)	(0.285)
Obs.	86	31	72	36	81	27	85	28
Clusters	13	13	12	11	12	11	38	20
R^2	0.034	0.065	0.083	0.073	0.015	0.165	0.076	0.081

Notes: OLS regression on choosing competition. Columns (1) and (2) contain data for the *No-Ties* treatment. Columns (3) and (4) contain data for the *Future-Prospect* treatment. Columns (5) and (6) contain data for the *Weak-Ties* treatment. Columns (7) and (8) contain data for the *Weak-Ties w/Future-Pr.* treatment. Δ *closeness* depicts the change in closeness through Chat I. In columns (1), (3), (5) and (7) the sample consists of subjects that report a similar closeness change to both subjects. (Difference in closeness change between both subjects $< |1|$) Columns (2), (4), (6) and (8) include the remaining subjects. Std. errors clustered at the level of Chat I groups and depicted in parentheses. ***(**/*) significant at the 1% (5%/10%) level.

Table A.8: Probability of choosing competition - homogeneous closeness changes

	Treatment Weak-Ties w/Future-Prospect and Treatment Weak-Ties		
	(1)	(2)	(3)
Δ *closeness high*	0.061	0.057	0.060
	(0.111)	(0.112)	(0.113)
Weak-Ties w/Future-Prospect	0.156	0.153	0.151
	(0.111)	(0.110)	(0.110)
Δ *closeness high*	-0.324**	-0.323**	-0.321**
× *Weak-Ties w/Future-Prospect*	(0.150)	(0.150)	(0.151)
Closeness before Chat I		-0.011	-0.011
		(0.024)	(0.024)
Male			0.036
			(0.073)
Constant	0.333***	0.355***	0.342***
	(0.079)	(0.088)	(0.094)
Obs.	166	166	166
Clusters	50	50	50
R^2	0.040	0.041	0.042

Notes: OLS regression on choosing competition. Data for the *Weak-Ties* and the *Weak-Ties w/Future-Prospect* treatment included. Δ *closeness high* has a value of 1 if Δ closeness is above the median, and 0 otherwise. *Weak-Ties w/Future-Prospect* is a dummy variable that has the value 1 if the *Weak-Ties w/Future-Prospect* treatment is played and 0 if the *Weak-Ties* treatment is played. *Closeness before Chat I* depicts the average level of closeness indicated on the IOS scale before Chat I. The sample is restricted to subjects that report similar closeness changes to both subjects in their group. (Difference in closeness change between both subjects $< |1|$) Std. errors clustered at the matching group level and depicted in parentheses. ***(**/*) significant at the 1% (5%/10%) level.

Table A.9: Change of average Closeness through Chat I

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Sentiment	0.475***						
	(0.133)						
Pos. emotions		0.358***					
		(0.131)					
Neg. emotions			-0.258**				
			(0.126)				
Disagreement				-0.196			
				(0.166)			
Agreement					0.213**		
					(0.101)		
Questions						0.268**	
						(0.118)	
Personal info							0.323
							(0.196)
Constant	-0.436	0.0575	1.673***	1.475***	0.490	0.226	0.817***
	(0.468)	(0.435)	(0.234)	(0.220)	(0.353)	(0.461)	(0.242)
Observations	428	428	428	428	428	428	428
Clusters	143	143	143	143	143	143	143
R^2	0.035	0.028	0.011	0.005	0.011	0.016	0.011

Notes: OLS regression of Δ closeness. The variables are the classifications of each chat according to the descriptions provided in Subsection 3.1. Standard errors (in parentheses) are clustered at the Chat I-group level.
***(**/*) significant at the 1% (5%/10%) level.

Table A.10: Change of closeness through Chat I and Big Five personality traits of other person

	Δ Individual closeness	
	(1)	(2)
Male		-0.035
		(0.127)
Agreeableness (Big 5)	-0.048	-0.025
(of other person)	(0.053)	(0.048)
Conscientiousness (Big 5)	-0.021	-0.017
(of other person)	(0.049)	(0.043)
Extraversion (Big 5)	-0.062	-0.031
(of other person)	(0.042)	(0.036)
Openess (Big 5)	0.031	0.016
(of other person)	(0.059)	(0.054)
Emotionalstability (Big 5)	0.010	-0.005
(of other person)	(0.043)	(0.037)
Closeness before Chat I		-0.498***
		(0.048)
Constant	1.631***	2.544***
	(0.393)	(0.339)
Obs.	886	886
Clusters	149	149
R^2	0.004	0.213

Notes: OLS regression of the difference in stated closeness to each other group member after and before Chat I. All Big 5 traits are values $\in (1, 7)$ and measured via the short Big 5 questionnaire (Gosling et al., 2003). Standard errors (in parentheses) are clustered at the Chat-I-group level.

***(**/*) significant at the 1% (5%/10%) level.

Table A.11: Informing oneself about task

	# example viewed			# seconds example viewed		
	(1)	(2)	(3)	(4)	(5)	(6)
Male	0.012			0.243		
	(0.044)			(0.843)		
Competition		-0.015			-0.291	
		(0.043)			(0.833)	
Task-performance			-0.000			-0.003
			(0.000)			(0.007)
Constant	1.074***	1.084***	1.049***	14.213***	14.415***	13.858***
	(0.027)	(0.027)	(0.057)	(0.510)	(0.519)	(1.099)
Obs.	446	446	446	446	446	446
Letter Grid F.E.	no	no	yes	no	no	yes
R^2	0.000	0.000	0.017	0.000	0.000	0.008

Notes: Columns (1) - (3) report the results of OLS regressions on the number of times the example is viewed. Columns (4) - (6) report the results of OLS regressions on the accumulated number of seconds the example is viewed. *competition* is a dummy variable with value 1 if the subject played the task in competition. *task-performance* represents the number of seconds needed to solve the task (capped at 200). One of four letter grids was randomly chosen to be played in a session. The regressions in columns (3) and (6) include fixed effects for the letter grid that is played.
***(**/*) significant at the 1% (5%/10%) level.

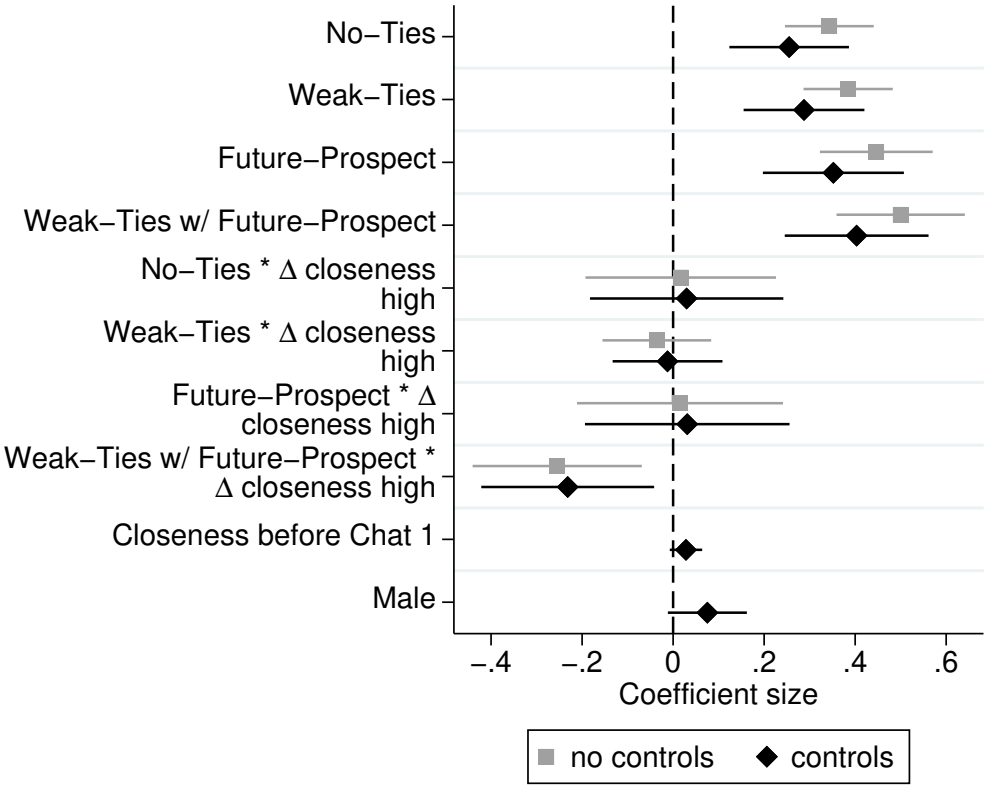
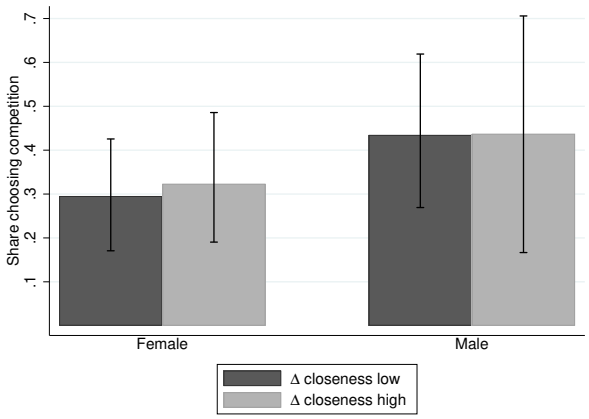
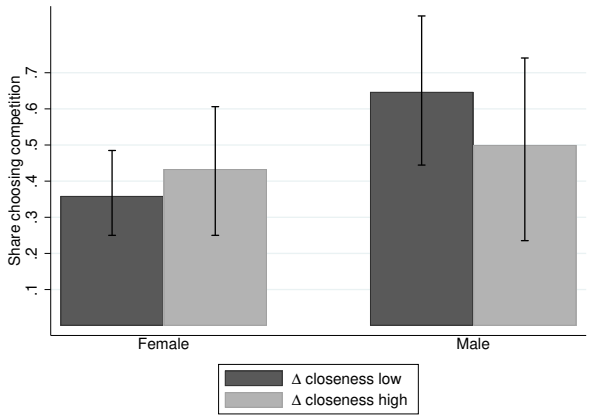


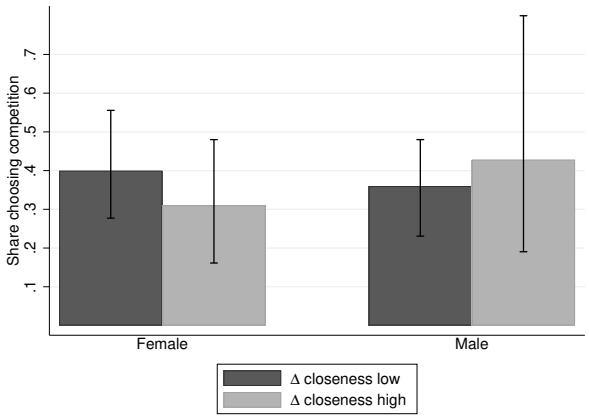
Figure A.1: Coefficient plot of pooled regression complementing Table 2



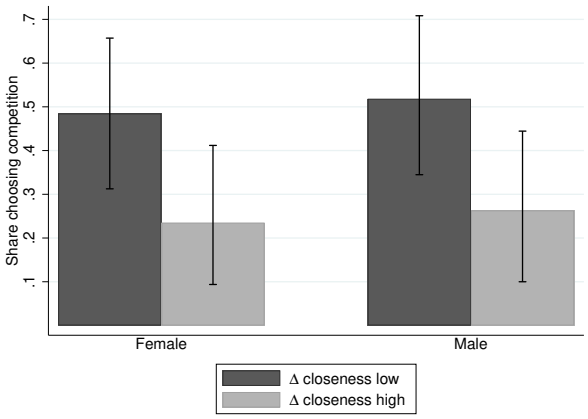
(a) No-Ties



(b) Future-Prospect



(c) Weak-Ties



(d) Weak-Ties w/Future-Prospect

Figure A.2: Choice to compete in all treatments, split by gender of the participant.

Notes: The share of males and females choosing competition in all treatments. Whiskers represent the 95% confidence intervals.

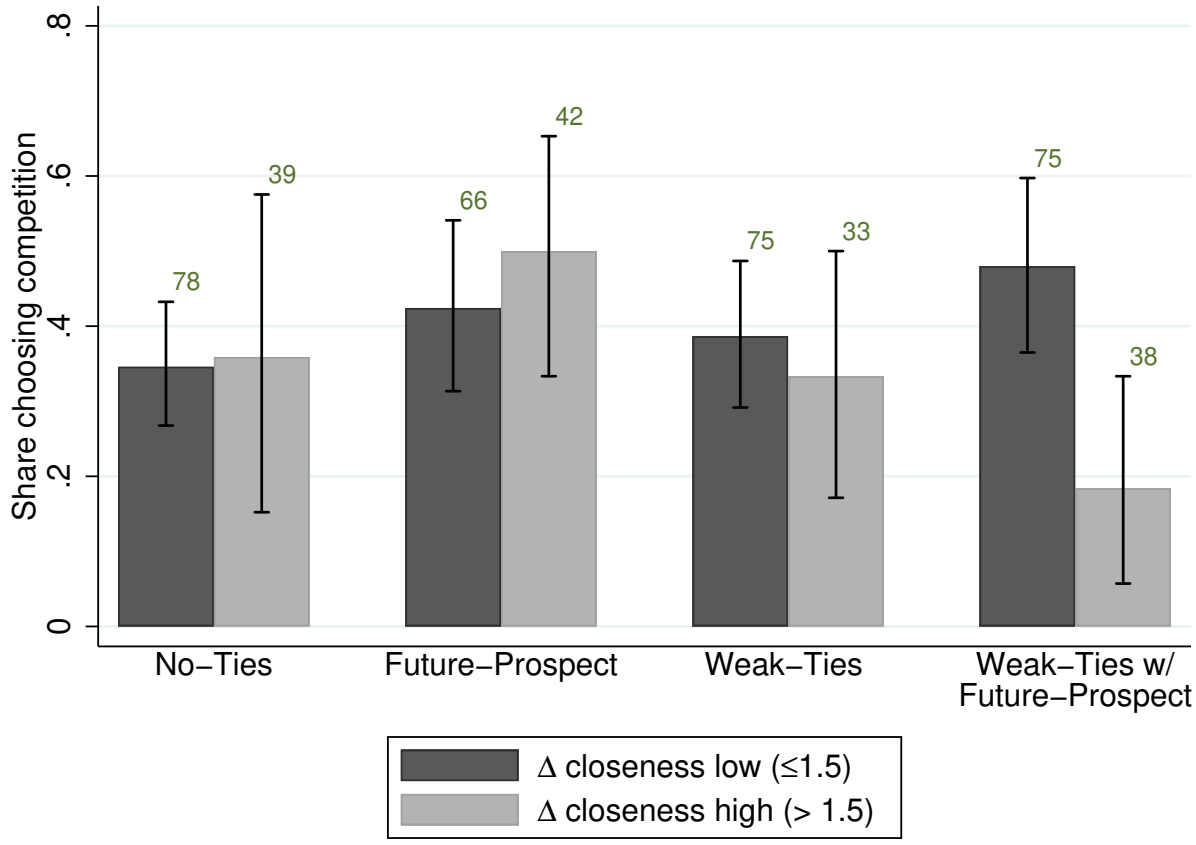


Figure A.3: Effect of closeness difference via Chat I on choice to compete in different treatments.

Notes: Low closeness is defined as a difference in average closeness ≤ 1.5, high closeness as a difference in average closeness > 1.5. Whiskers represent 95% confidence intervals based on bootstrapped standard errors (10,000 repetitions with clustering at the matching group level).

B Beliefs

In Figure B.1 we investigate the relationship between belief formation and closeness across treatments. There are three interesting results. First, in all treatments, subjects are not indifferent between choosing competition and playing alone. In all treatments, subject indicate a probability that other subjects chose competition that is significantly different from the lowest two levels on the scale from 1 to 5. Second, when comparing the *Weak-Ties* and *Weak-Ties w/Future-Prospect* treatment, we find that subjects are significantly less likely to believe that the other subjects enter the competition if they meet again after the competition (p-value = 0.01). Third, we do not find any correlation between closeness and belief about competition choices of other subjects in the *No-Ties* and *Future-Prospect* treatments. However, we find that in the *Weak-Ties* and *Weak-Ties w/Future-Prospect* treatment, higher closeness is negatively related to beliefs about the other subjects' competition choices. This is in line with our findings from Section 3.[16]

Figure B.2 informs about the accuracy of the beliefs. There is no positive correlation between the belief about the other player's competition choice and the other player's actual competition choice in the No-ties and Future-Prospect treatments. In the *Weak-Ties* and *Weak-Ties w/Future-Prospect* treatments, however, there is a positive correlation between belief and the actual outcome. Although this correlation is not extremely strong, this implies that subjects might have learned something about the willingness to compete with the other players through Chat I. This is particularly interesting, as no one was informed about the subsequent stages of the game during Chat I. Therefore no one specifically talked about the willingness to compete, competitiveness, or skills in a letter grid task.

[16] Adding the belief about the probability of entering competition to the regression of our main result from Section 3.2 does not qualitatively change the result.

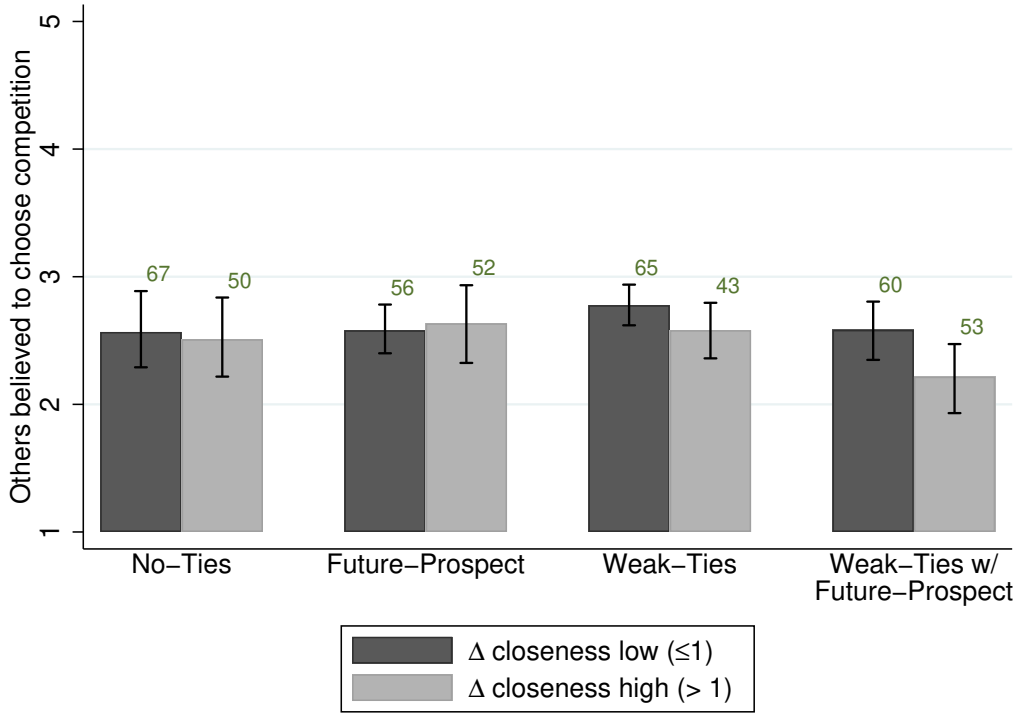
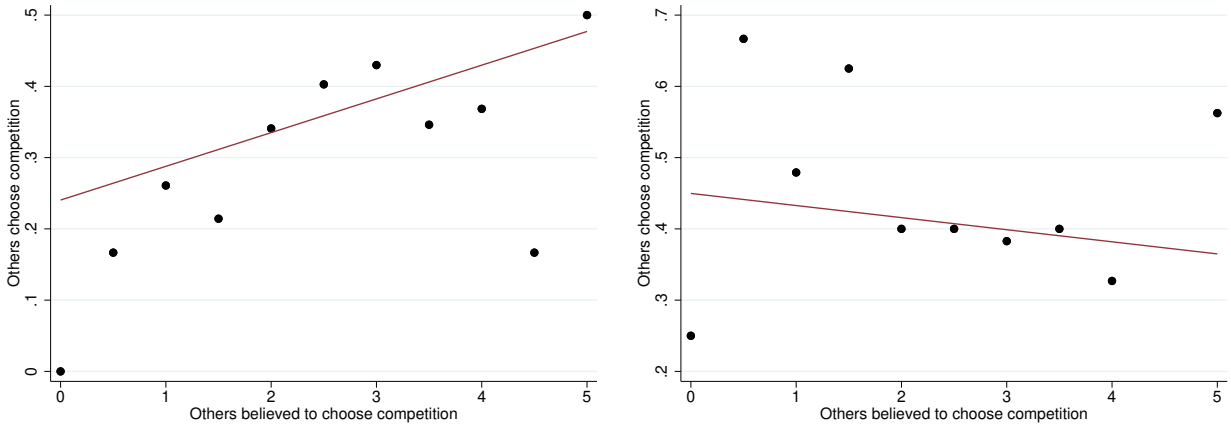


Figure B.1: Beliefs about competition choices by treatment and closeness change



(a) Meeting before competition (*Weak-Ties w/Future-Prospect* and *Weak-Ties*)

(b) Not meeting before competition (*No-Ties* and *Future-Prospect*)

Figure B.2: Accuracy of beliefs about the competition choices of other subjects

C Decision Screens Including Instructions

Examples of the Decision Screens (in German) are provided. The translation of the decision screens (from top to bottom) is provided in the figure notes of each screenshot.

Figure C.1: Gender elicitation, all treatments.

Notes: 'Assignment of the nickname Please enter your gender. This information is required to randomly assign you a nickname in the next step. The random assignment of a nickname ensures that anonymity in the experiment is guaranteed. Male / Female. Please click Continue when you have made your selection. "

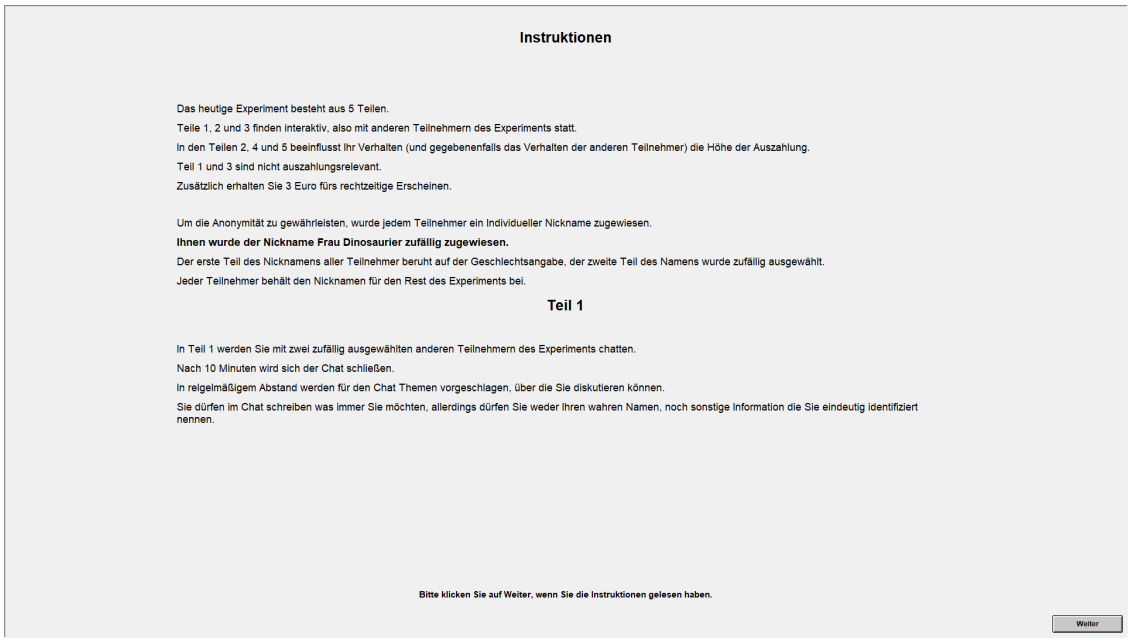


Figure C.2: Instructions part I, all treatments.

Notes: 'Instructions. Today's experiment consists of 5 parts. Parts 1, 2 and 3 take place interactively, i.e. with other participants in the experiment. In parts 2, 4 and 5 your behavior (and possibly the behavior of the other participants) influences the amount of the payout. Parts 1 and 3 are not relevant for payment. In addition, you will receive 3 euros for appearing on time. To ensure anonymity, each participant was assigned an individual nickname. You were randomly assigned the nickname Mrs. Dinosaur. The first part of the nickname of all participants is based on the gender, the second part of the name was chosen at random. Each participant keeps the nickname for the rest of the experiment. Part 1. In Part 1, you will chat with two other randomly selected participants in the experiment. After 10 minutes the chat will close. Topics that you can discuss are suggested for the chat at regular intervals. You may write whatever you want in the chat, but you may not give your real name or any other information that clearly identifies you. Please click Continue when you have read the instructions."

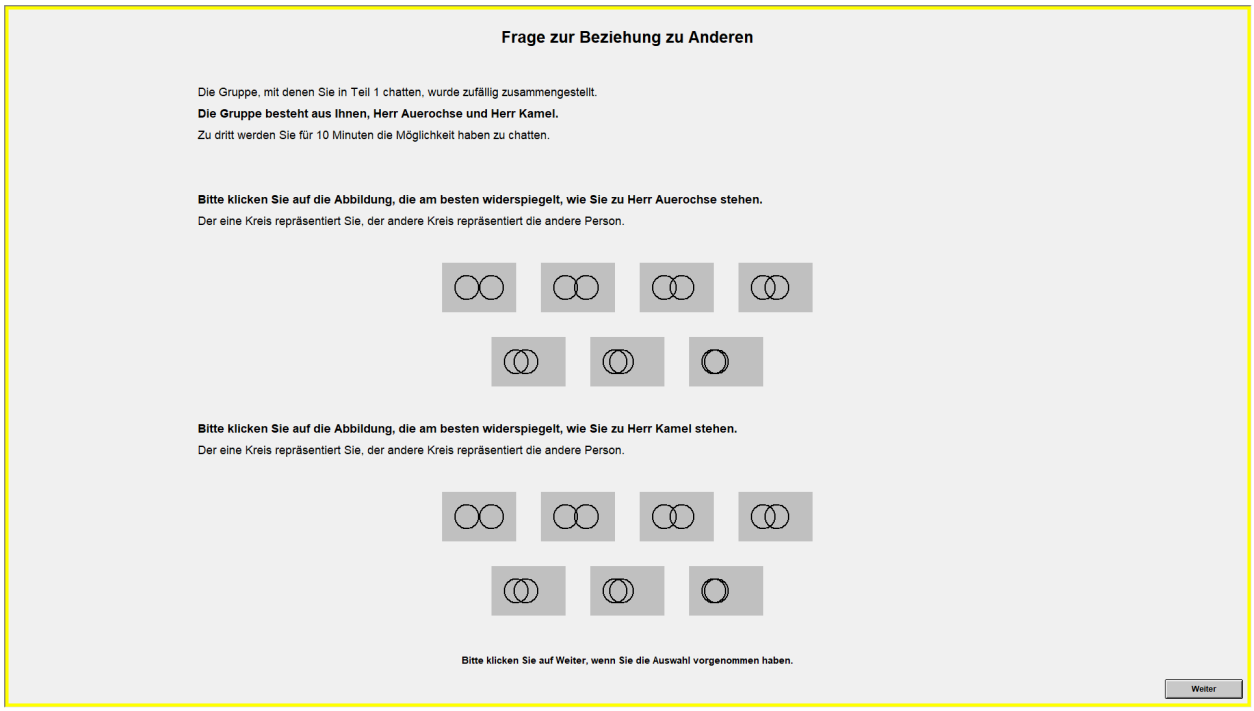


Figure C.3: Closeness elicitation I, all treatments.

Notes: 'Question about relationships with others. The group you chat with in Part 1 was randomly selected. The group consists of you, Mr. Aurochs and Mr. Camel. The three of you will have the opportunity to chat for 10 minutes. Please click on the image that best reflects how you feel about Mr. Aurochs. One circle represents you, the other circle represents the other person. Please click on the image that best reflects how you feel about Mr. Aurochs. One circle represents you, the other circle represents the other person. Please click Continue when you have made your selection."

Figure C.4: Chat I, all treatments.

Notes: 'Part 1 (Chat). Current topic: If you could choose from everyone in the world, who would you invite to dinner? You have been given the nickname Mister Crow. You chat with Ms. Armadillo and Ms. Buffalo. Time left in this chat: less than 9 minutes."

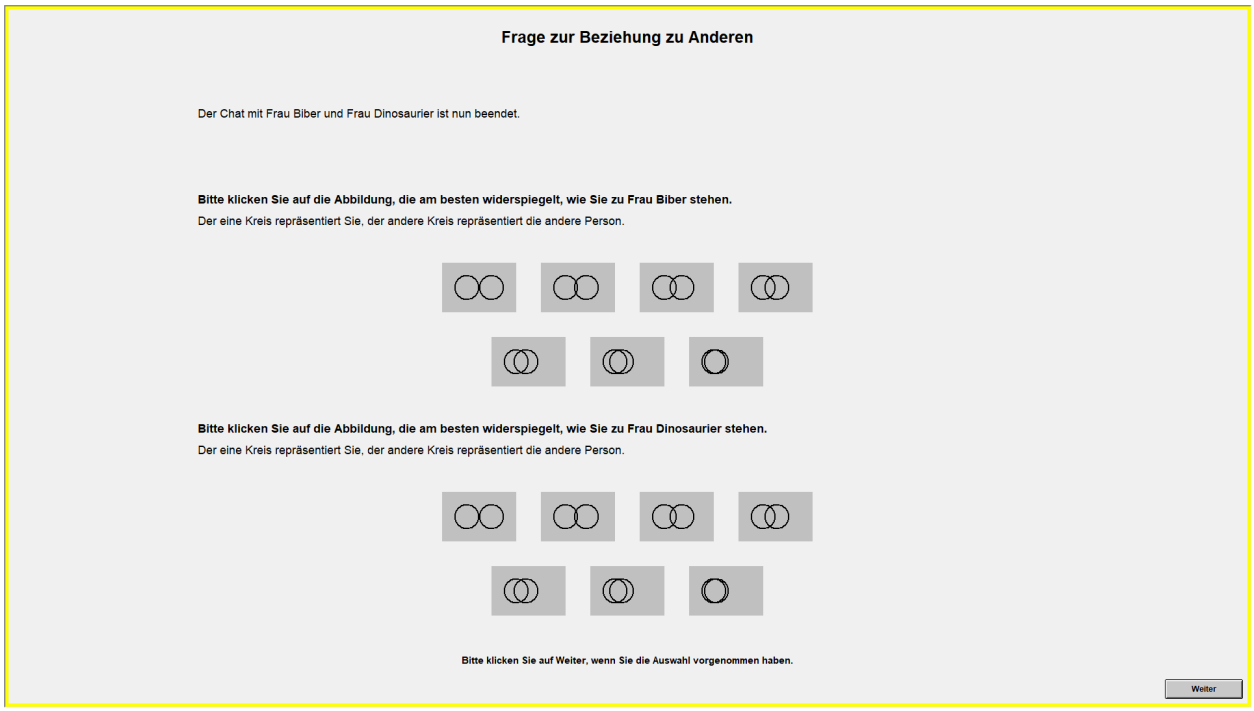


Figure C.5: Closeness elicitation II, all treatments.

Notes: 'Question about relationships with others. The chat with Ms. Beaver and Ms. Dinosaurs is now over. Please click on the image that best reflects how you feel about Mr. Beaver. One circle represents you, the other circle represents the other person. Please click on the image that best reflects how you feel about Ms. Dinosaur. One circle represents you, the other circle represents the other person. Please click Continue when you have made your selection."

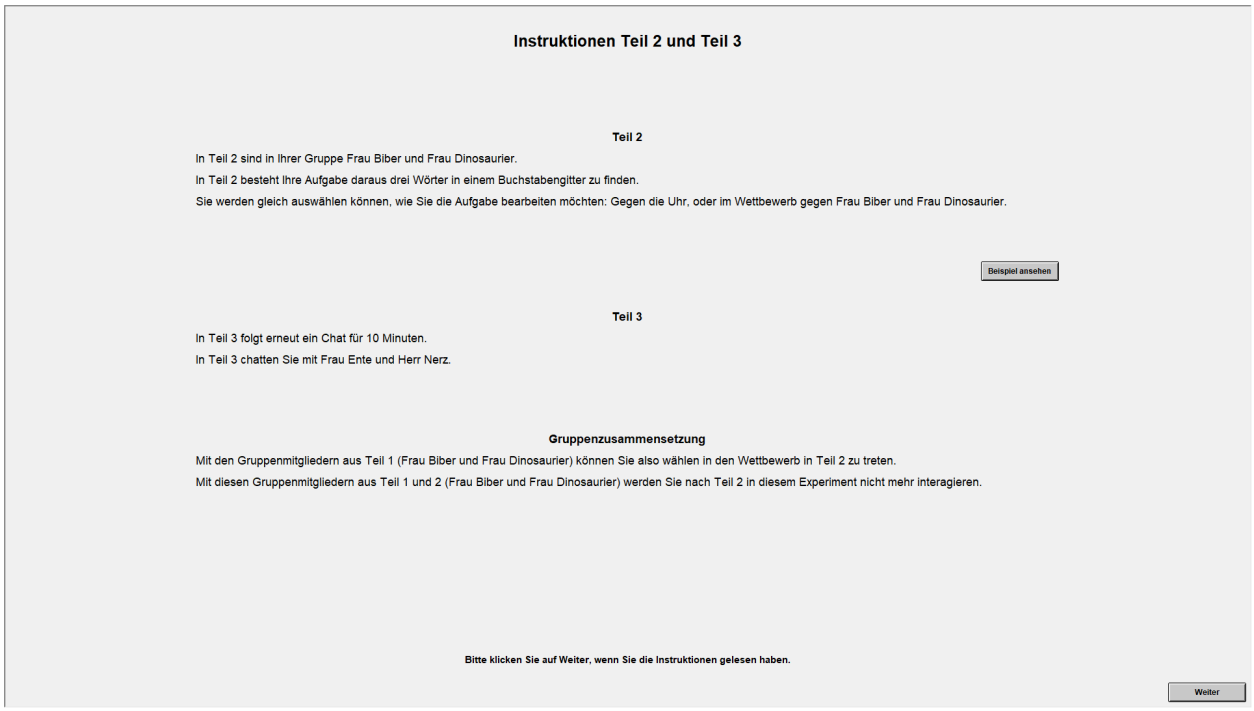


Figure C.6: Instructions part 2 and 3, treatment 2

Notes: 'Instructions part 2 and part 3. Part 2. In Part 2, your group includes Mrs. Beaver and Mrs. Dinosaur. In part 2 your task is to find three words in a grid of letters. You'll be able to choose how you want to complete the task: against the clock, or compete against Mrs. Beaver and Mrs. Dinosaur. See Example. Part 3. In part 3 there will be a 10 minute chat again. In part 3 you chat with Ms. Duck and Mr. Mink. Group composition. With the group members from Part 1 (Mrs. Beaver and Mrs. Dinosaur) you can choose to compete in Part 2. You will no longer interact with these group members from Parts 1 and 2 (Mrs. Beaver and Mrs. Dinosaur) after Part 2 of this experiment. Please click Continue when you have read the instructions."

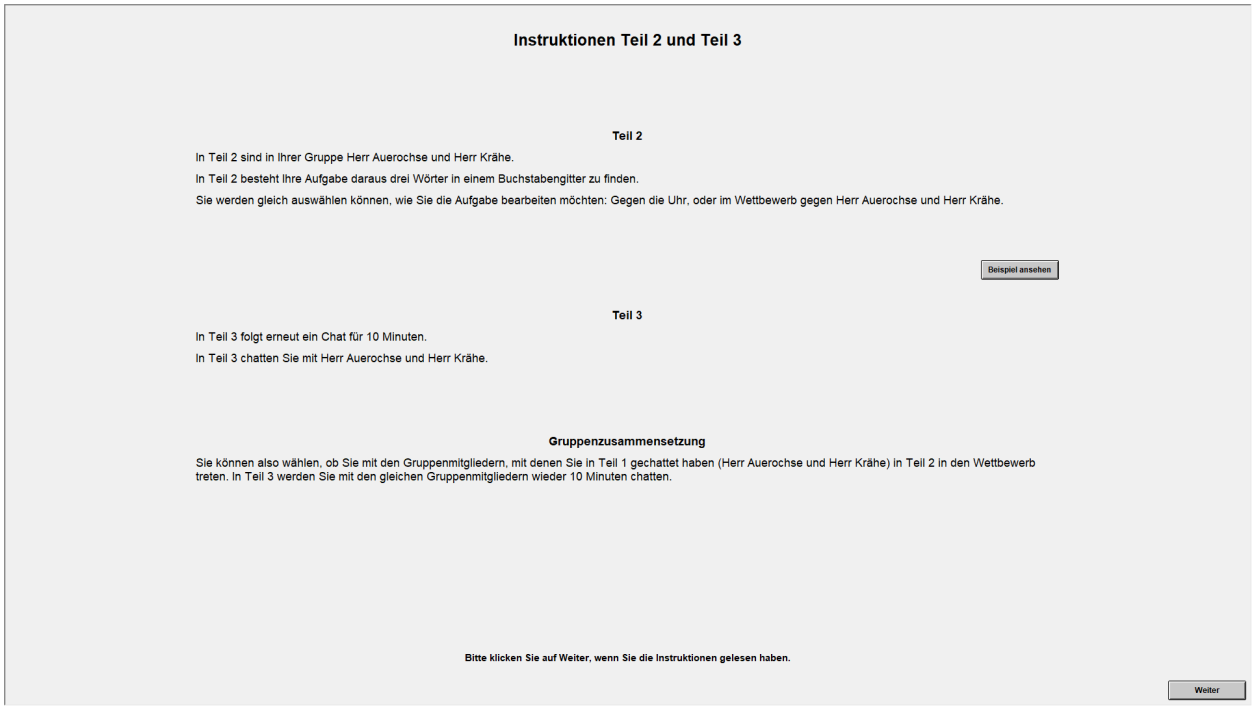


Figure C.7: Instructions part 2 and 3, treatment 4

Notes: 'Instructions part 2 and part 3 Part 2. In Part 2, your group includes Mr. Aurochs and Mr. Crow. In part 2 your task is to find three words in a grid of letters. You'll be able to choose how you want to complete the task: against the clock, or compete against Mr. Aurochs and Mr. Crow. See Example. Part 3. In part 3 there will be a 10 minute chat again. In part 3 you chat with Mr. Aurochs and Mr. Crow. Group composition. With the group members from Part 1 (Mr. Aurochs and Mr. Crow.) you can choose to compete in Part 2. In Part 3 you will chat with the same group members again for 10 minutes. Please click Continue when you have read the instructions."

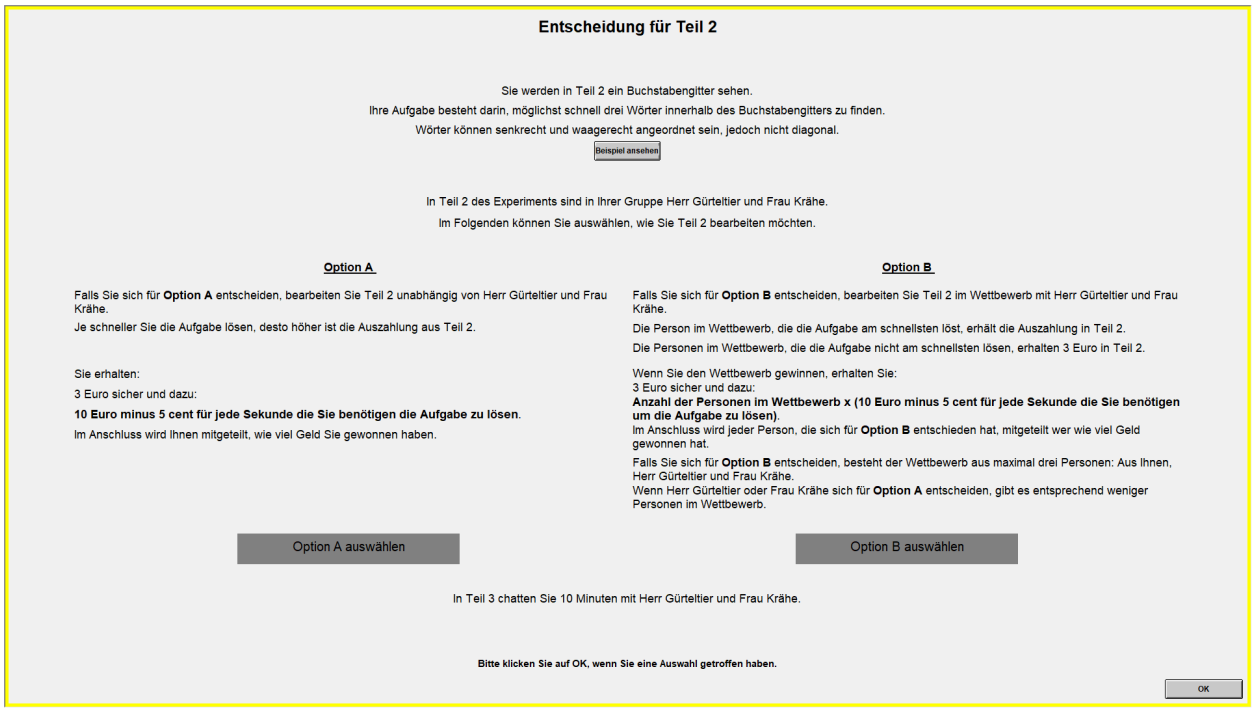


Figure C.8: Competition choice, matching between parts depends on treatment. Option A and B randomly counterbalanced.

Notes: 'Decision for part 2. You will see a grid of letters in Part 2. Your task is to find three words within the grid of letters as quickly as possible. Words can be arranged vertically and horizontally, but not diagonally. see example. In Part 2 of the experiment, your group includes Mr. Armadillo and Mrs. Crow. Below you can choose how you want to work in Part 2. Option A. If you choose option A, complete Part 2 independently from Mr. Armadillo and Mrs. Crow. The faster you solve the task, the higher the payout from Part 2. You receive: 3 euros for sure: 10 euros minus 5 cents for every second you need to solve the task. You will then be told how much money you have won. Choose option A. Option B. If you choose option B, complete part 2 in competition with Mr. Armadillo and Mrs. Crow. The person in the competition who solves the task the fastest gets the payout in Part 2. The people in the competition who do not solve the task the fastest receive 3 euros in part 2. If you win the competition you will receive: 3 euros for sure: Number of people in the competition x (10 euros minus 5 cents for each second you need to solve the task). Afterwards, each person who has chosen option B will be told who won how much money. If you choose option B, the competition consists of a maximum of three people: you, Mr. Armadillo and Mrs. Crow. If Mr. Armadillo or Mrs. Crow choose option A, there will be correspondingly fewer people in the competition. Choose option B. In part 3 you chat with Mr. Armadillo and Mrs. Crow. Please click OK when you have made a selection."

Figure C.9: Beliefs about competition choice of others, all treatments.

Notes: 'Assessment of the behavior of others. Please rate how likely you think it is that the group members selected option B from Part 2. How likely do you think it is that Mrs. Beaver chose option B (very unlikely - very likely) How likely do you think it is that Mrs. Dinosaur chose option B (very unlikely - very likely) Please click Continue when you have answered the questions."

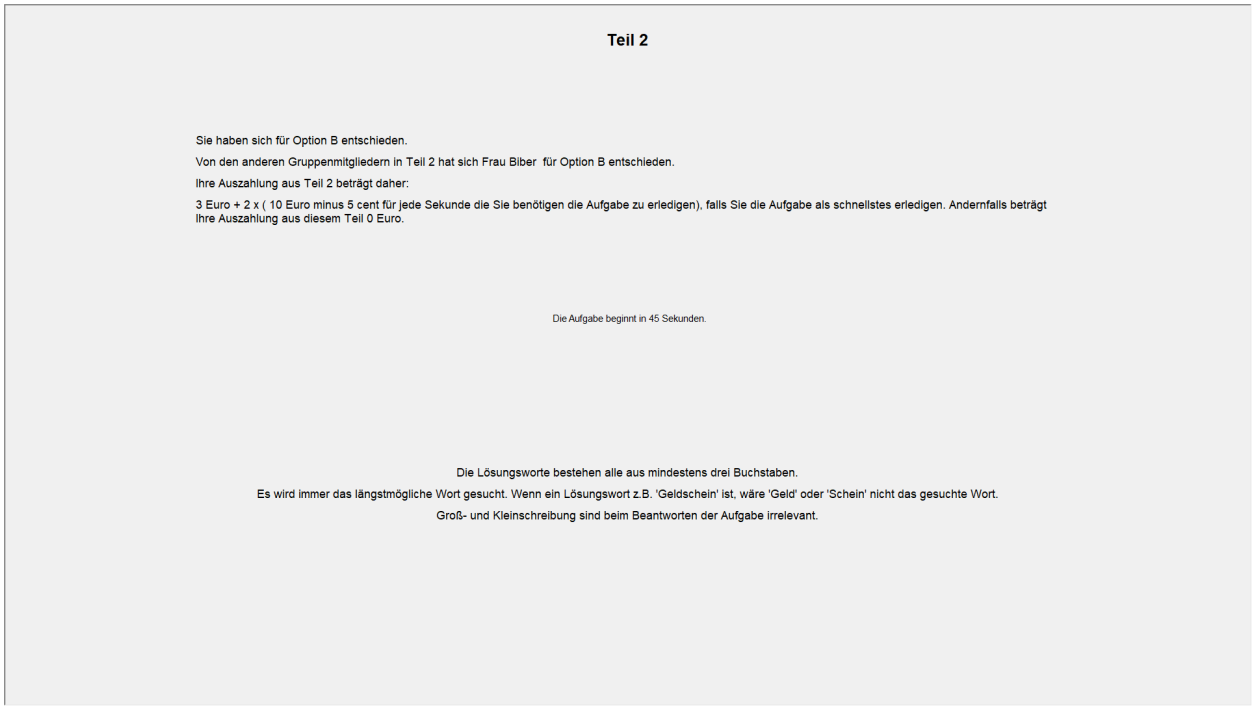


Figure C.10: Announcement task. Subject chose competition. All treatments.

Notes: 'Part 2 You have chosen option B. From the other group members in part 2, Ms. Beaver chose option B. Your payout from Part 2 is therefore: 3 euros + 2 x (10 euros minus 5 cents for each second you need to complete the task) if you complete the task as the fastest. Otherwise, your payout from this part is 0 euros. The task starts in 45 seconds. The solution words consist of at least 3 letters. The longest possible word is always searched for. For example, if a solution word is 'banknote', 'bank' or 'note' would not be the searched word. Upper and lower case are irrelevant when answering the task."

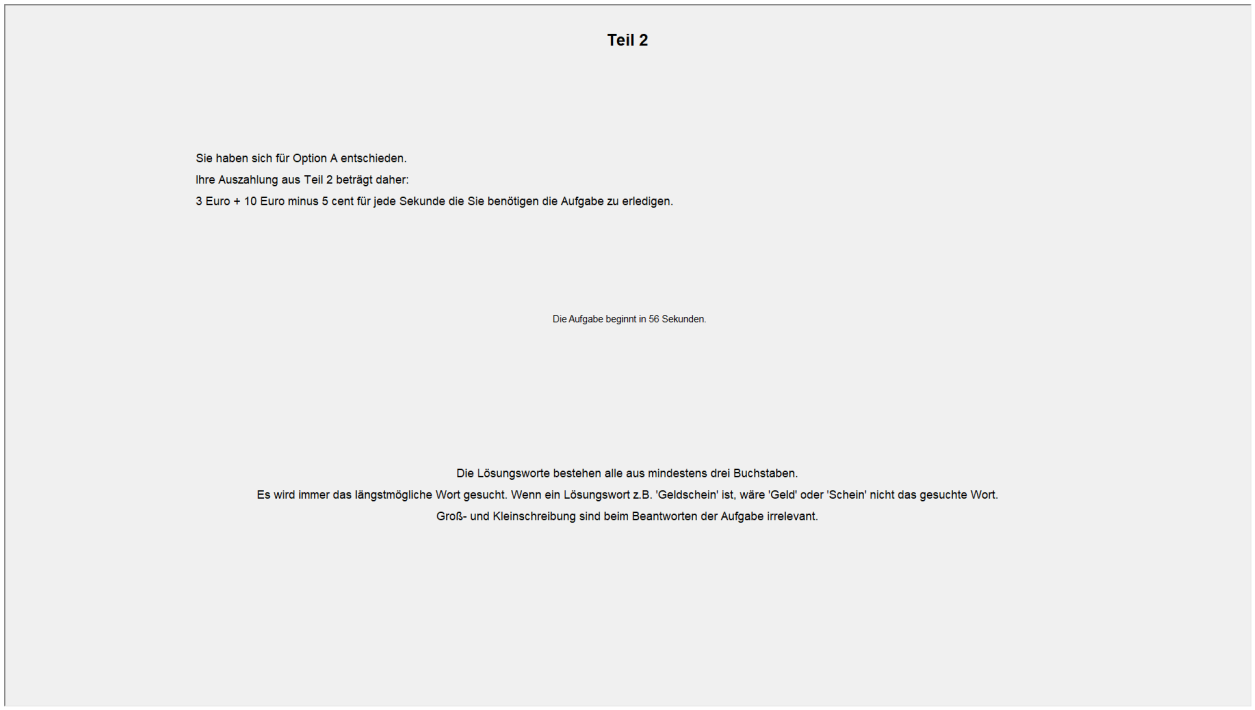


Figure C.11: Announcement task. Subject did not choose competition. All treatments.

Notes: 'Part 2 You have chosen option A. Your payout from Part 2 is therefore: 3 euros + 10 euros minus 5 cents for each second it takes you to complete the task. The task starts in 56 seconds. The solution words consist of at least 3 letters. The longest possible word is always searched for. For example, if a solution word is 'banknote', 'bank' or 'note' would not be the searched word. Upper and lower case are irrelevant when answering the task."

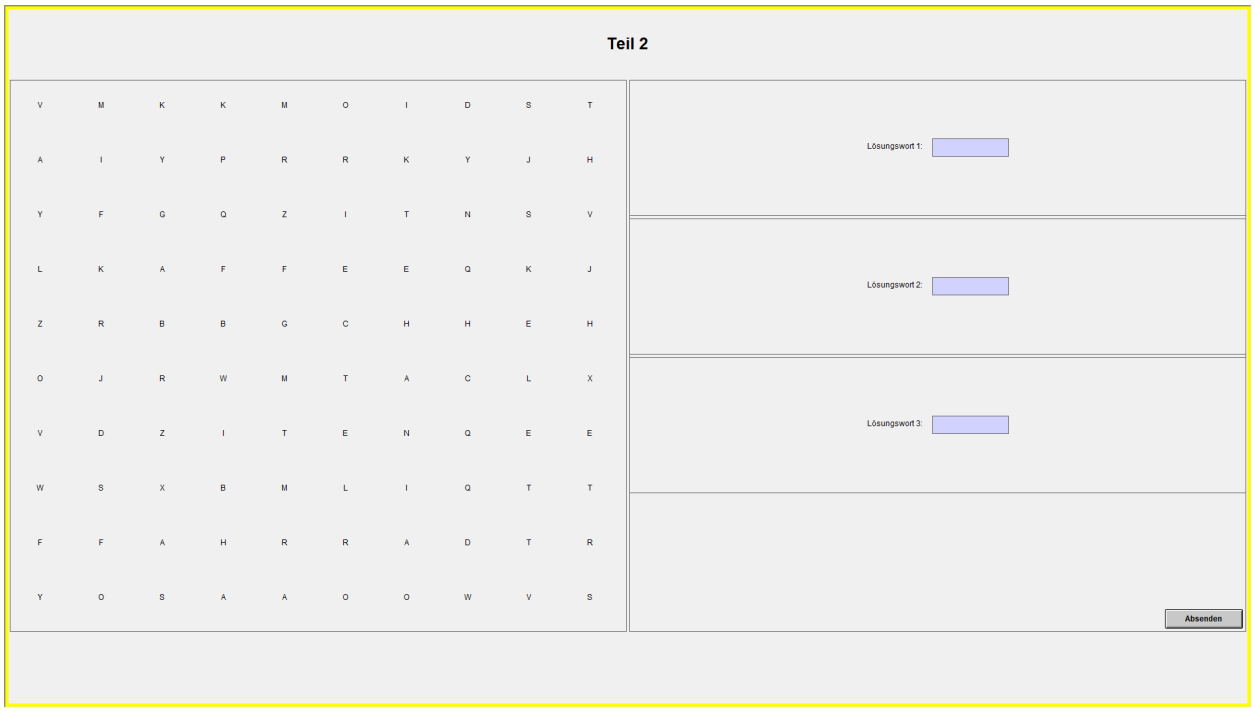


Figure C.12: Task, all treatments.

Notes: 'Solution word 1. Solution word 2. Solution word 3."

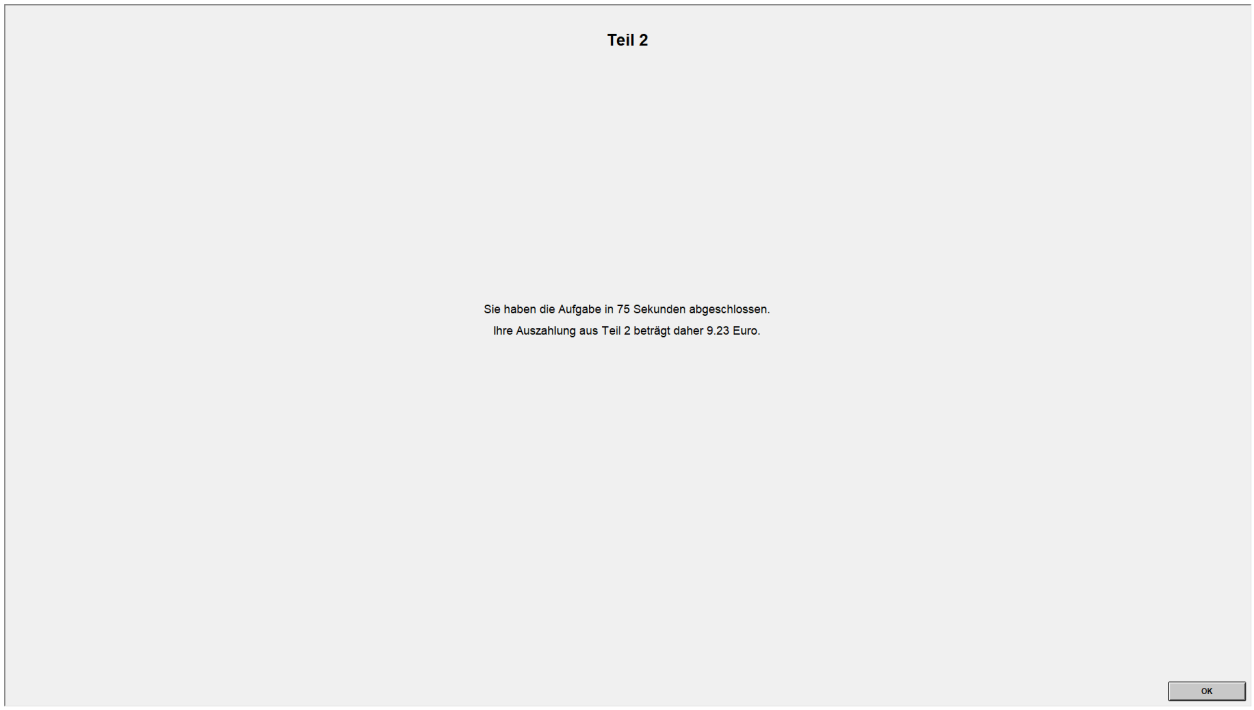


Figure C.13: Feedback of subject who did not choose competition, all treatments.

Notes: 'Part 2. You completed the task in 75 seconds. Your payout from part 2 is therefore 9.23 euros."

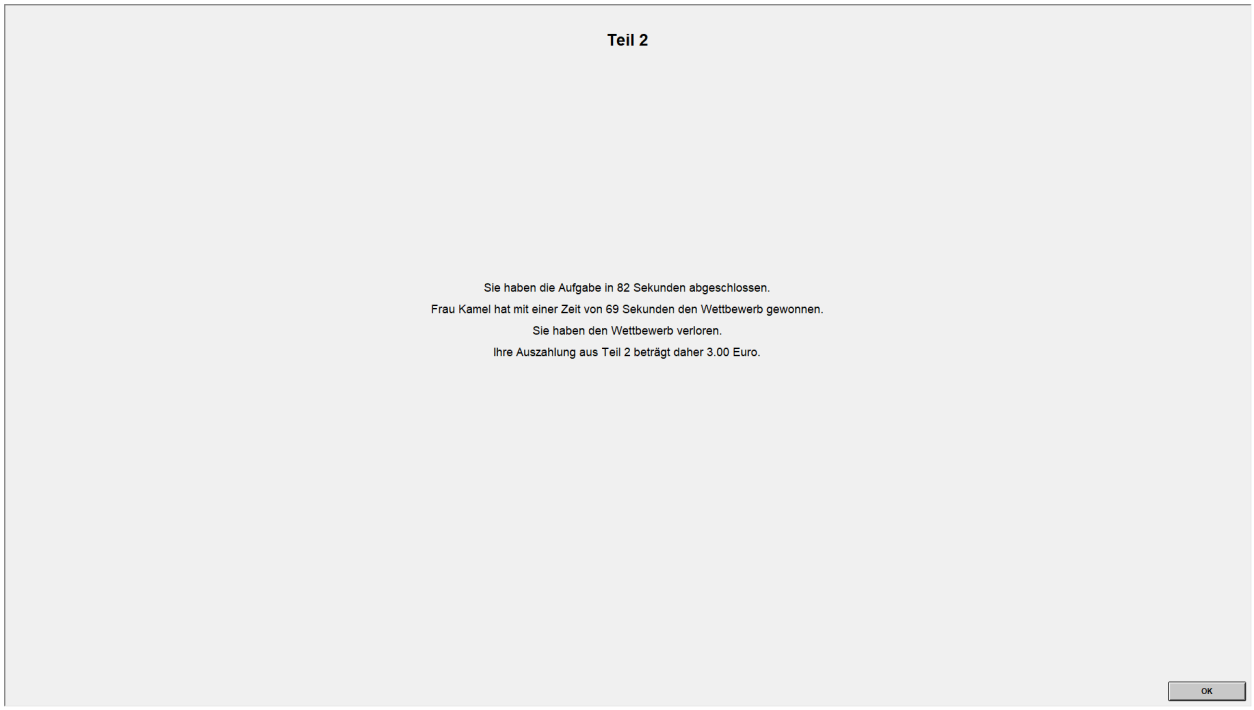


Figure C.14: Feedback of subject who chose competition and lost, all treatments.

Notes: 'Part 2 You completed the task in 82 seconds. Mrs. Kamel won the competition with a time of 69 seconds. You lost the competition. Your payout from part 2 is therefore 3 euros."

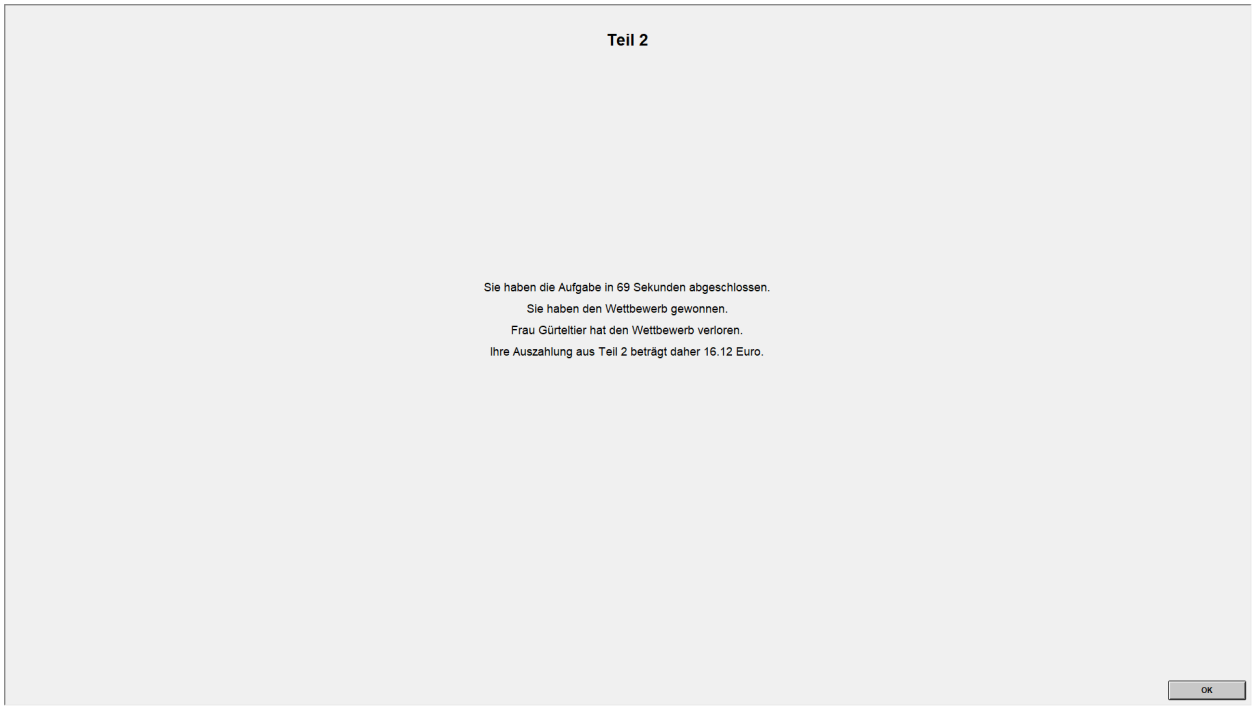


Figure C.15: Feedback of subject who chose competition and won, all treatments.

Notes: 'Part 2. You completed the task in 69 seconds. You won the competition. Ms. Armadillo lost the competition. Your payout from part 2 is therefore 16.12 euros."

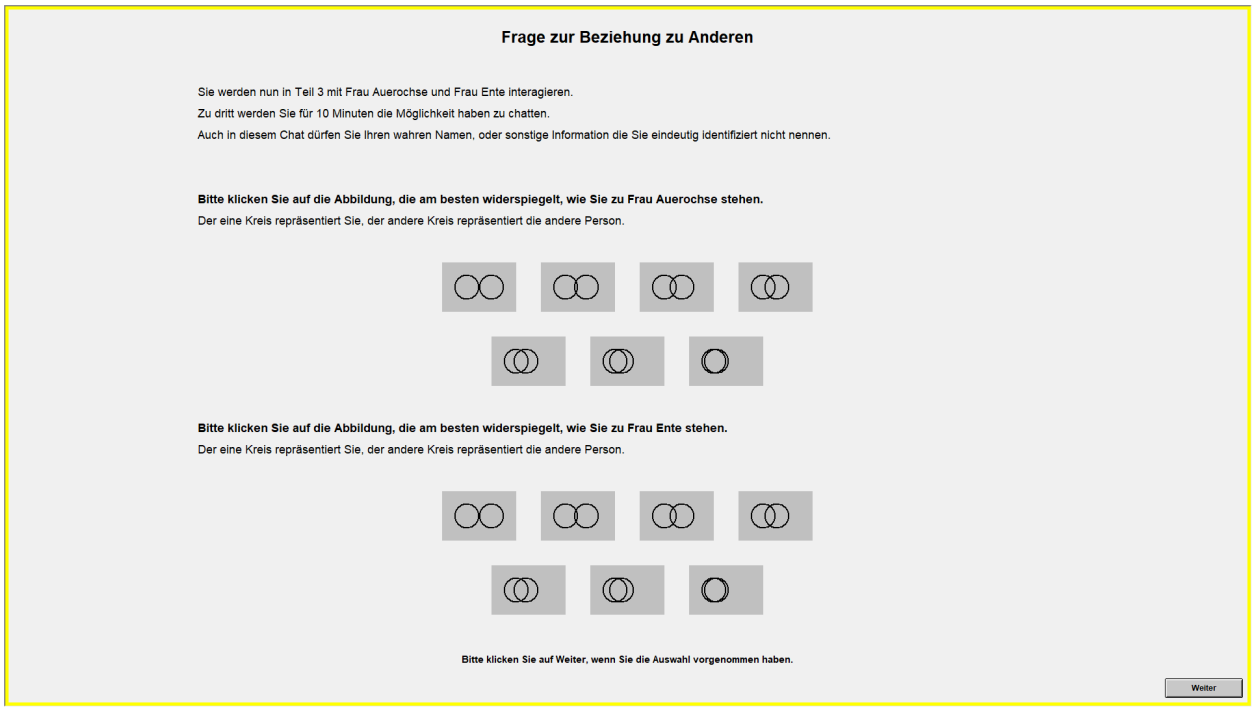


Figure C.16: Closeness elicitation III, all treatments.

Notes: 'Question about relationships with others. You will now interact with Ms. Aurochs and Ms. Duck in Part 3. The three of you will have the opportunity to chat for 10 minutes. In this chat, too, you are not allowed to give your real name or any other information that clearly identifies you. Please click on the image that best reflects how you feel about Ms. Aurochs. One circle represents you, the other circle represents the other person. Please click on the image that best reflects how you feel about Ms. Duck. One circle represents you, the other circle represents the other person. Please click Continue when you have made your selection."

Figure C.17: Chat II, all treatments.

Notes: 'Part 3 (Chat) Current topic: no topic yet. They were given the nickname Mr. Crow. They chat with Mr. Aurochs and Mr. Camel. Time left in this chat: 599 seconds."

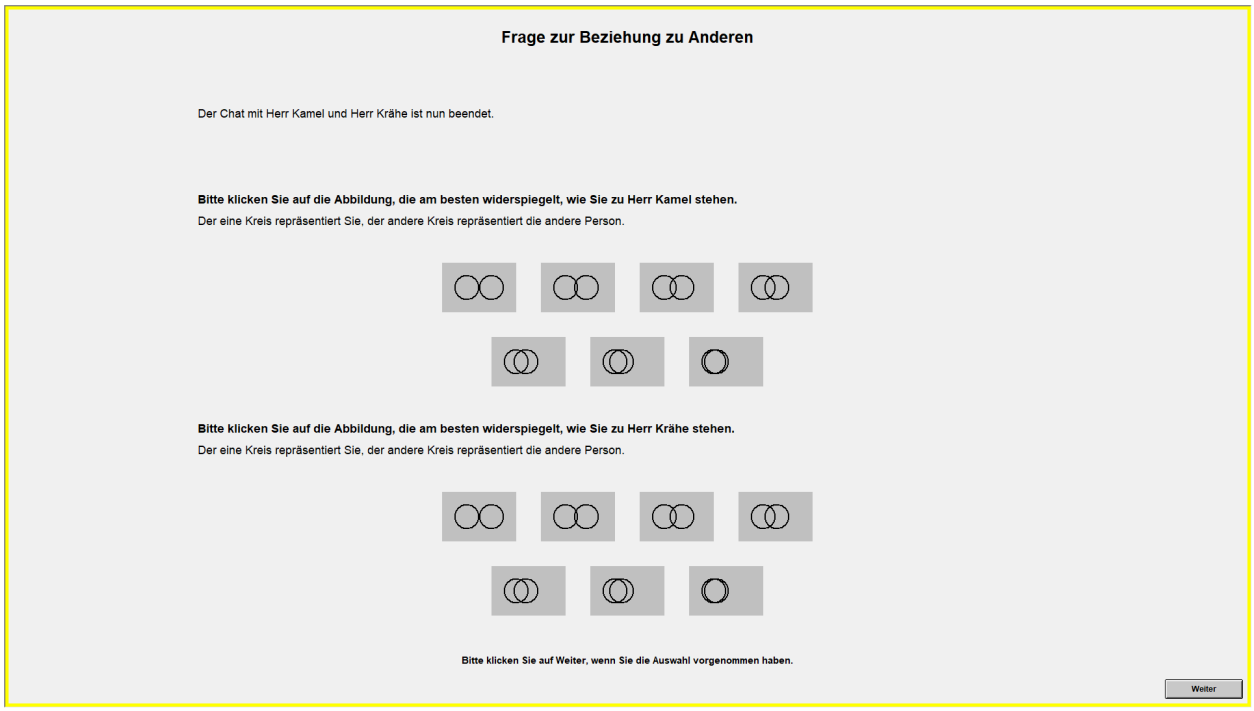


Figure C.18: Closeness elicitation IV, all treatments.

Notes: 'Question about relationship with others. The chat with Mr. Camel and Mr. Crow is now over. Please click on the image that best reflects how you feel about Mr. Camel. One circle represents you, the other circle represents the other person. Please click on the image that best reflects how you feel about Mr. Crow. One circle represents you, the other circle represents the other person. Please click Continue when you have made your selection. Continue."

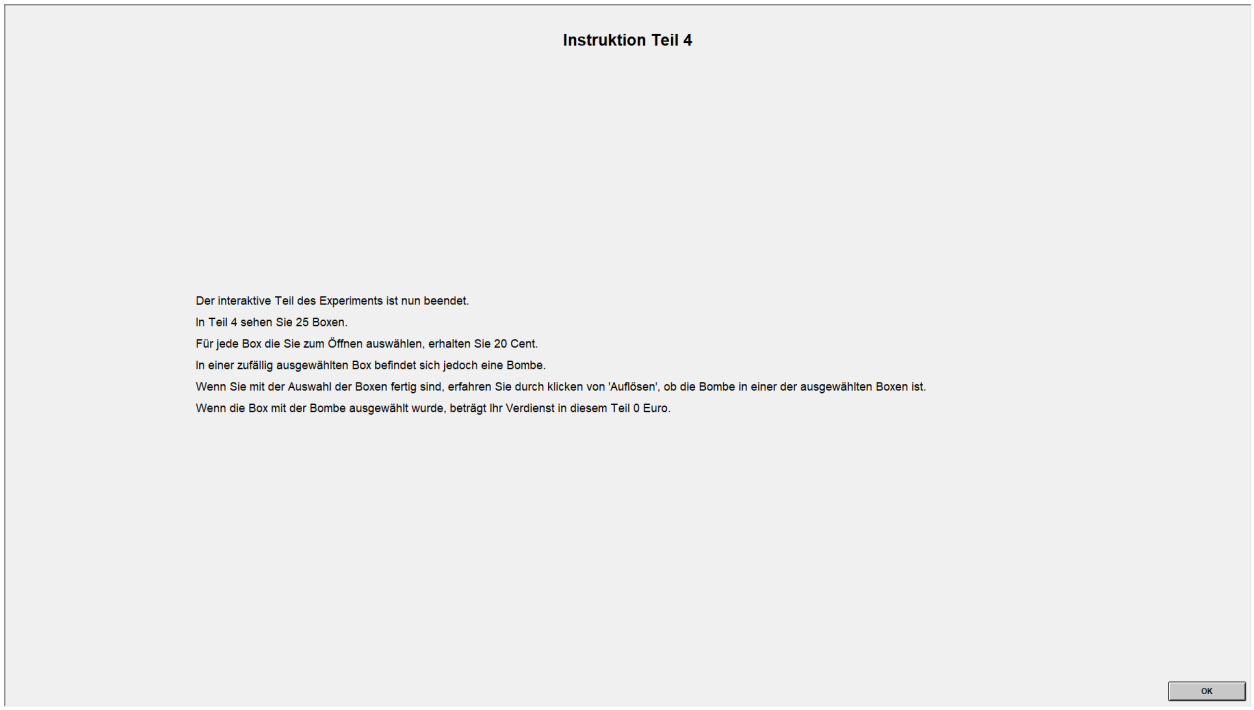


Figure C.19: Risk elicitation task, instructions. All treatments.

Notes: 'Instruction part 4. The interactive part of the experiment is now over. In part 4 you see 25 boxes. You get 20 cents for each box that you select to open. But one randomly selected box contains a bomb. After you finished the selection of the boxes, you learn through clicking on "Solve" whether one of the selected boxes contains a bomb. If the box with the bomb was selected, you get a payout of 0 euros in this part. Ok."

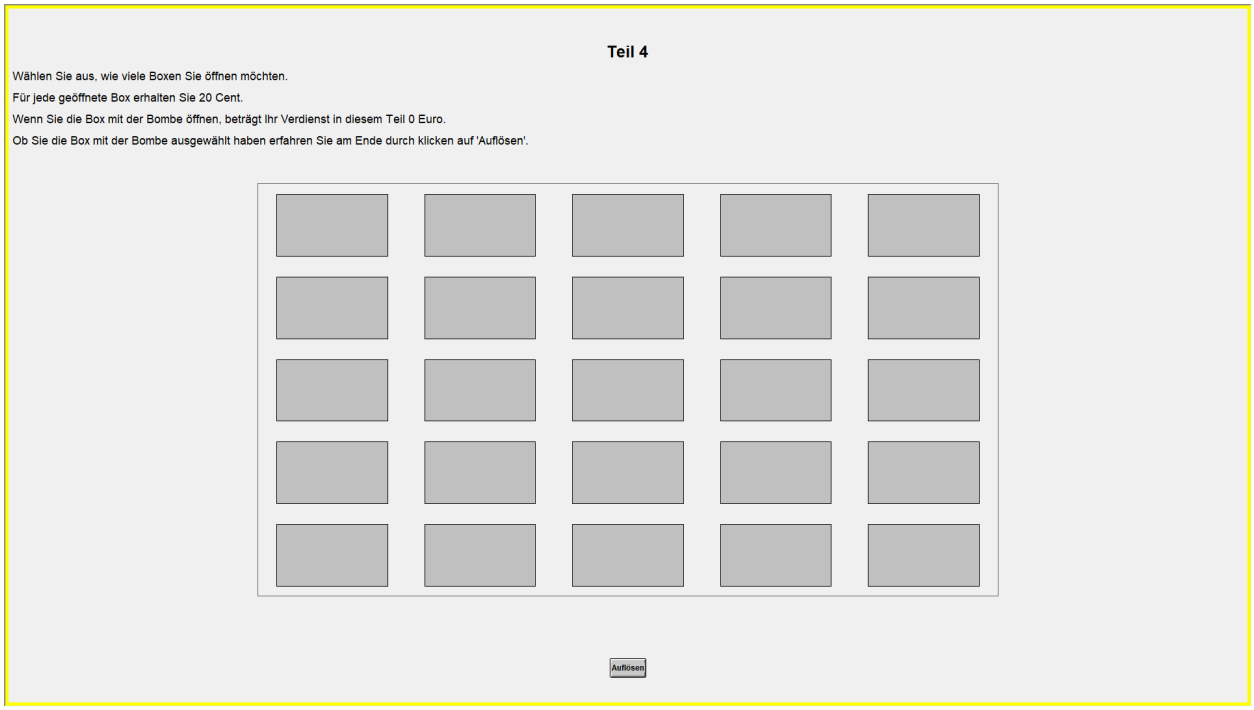


Figure C.20: Risk elicitation task, screen. All treatments.

Notes: 'Part 4. Choose how many boxes you want to open. You get 20 cents for every box you open. If you open the box with the bomb, your payout in this part will be 0 euros. You learn whether you have selected the box with the bomb by clicking on "Solve" at the end. Solve. "

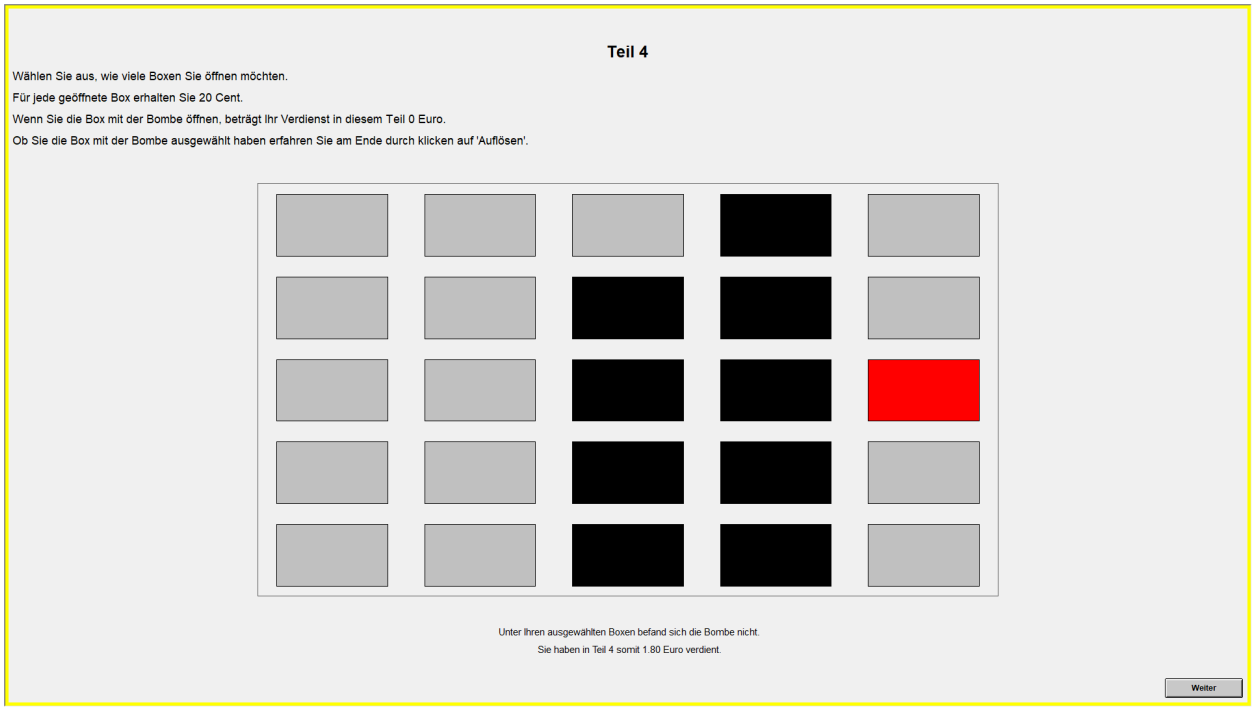


Figure C.21: Risk elicitation task, feedback. All treatments.

Notes: 'Part 4. Choose how many boxes you want to open. You get 20 cents for every box you open. If you open the box with the bomb, your earnings in this part will be 0 euros. You learn whether you have selected the box with the bomb by clicking on "Solve" at the end. The bomb was not among your selected boxes. Therefore, your payoff is 1.8 euros in this part. Continue."

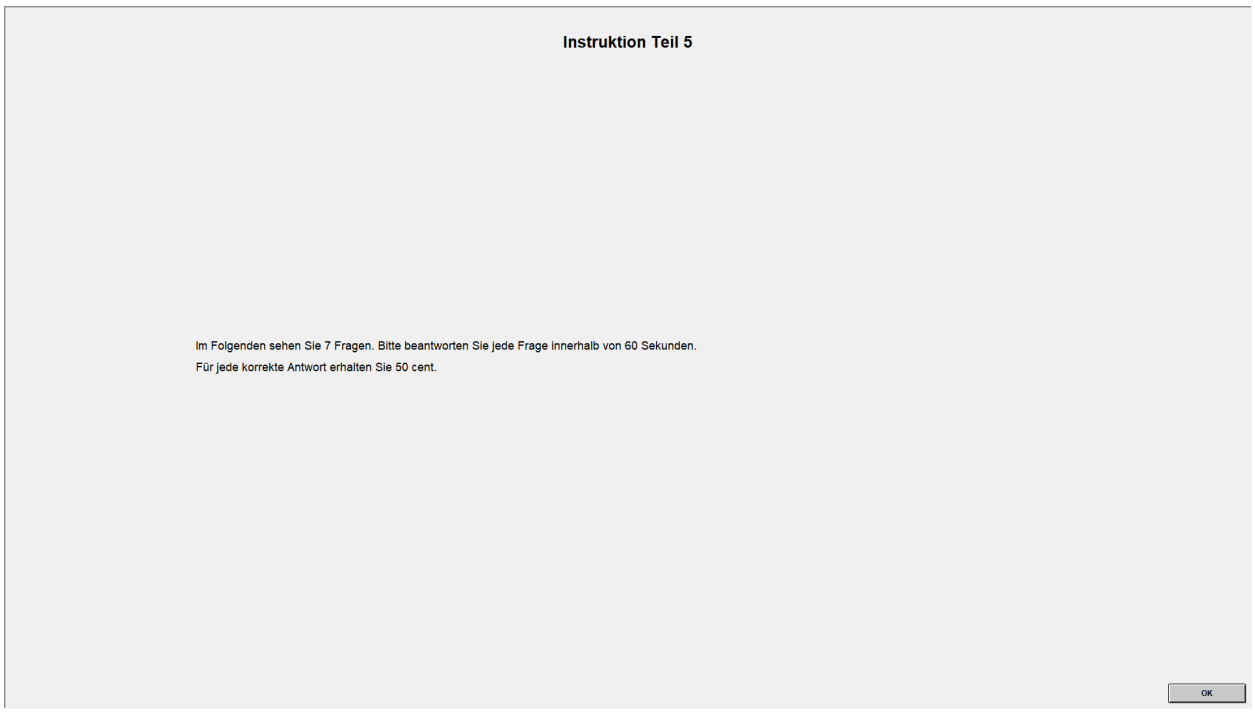


Figure C.22: CRT Instructions, all treatments.

Notes: 'Instruction part 5. You will see 7 questions. Please answer every question within 60 seconds. You get 50 cents for every correct answer. Ok."

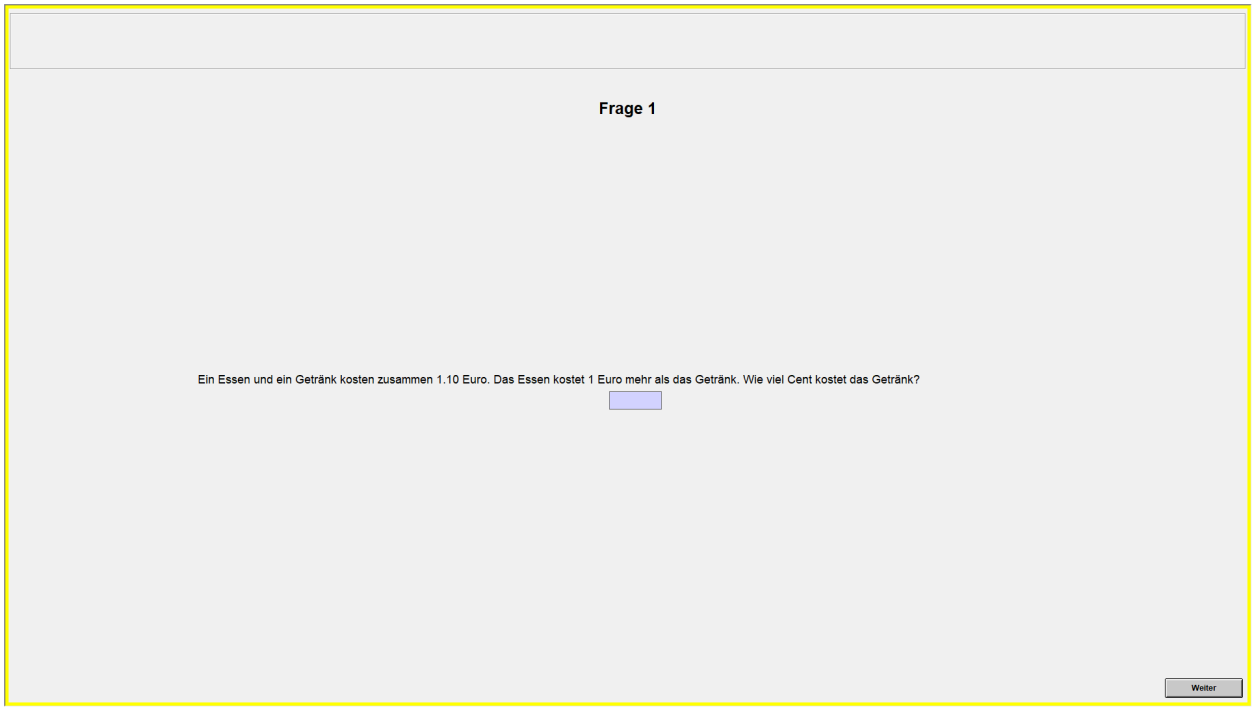


Figure C.23: CRT Question 1, all treatments.

Notes: 'Question 1. One meal and one drink cost 1.1 euros together. The meal costs 1 euro more than the drink. How many cents does the drink cost? Continue."

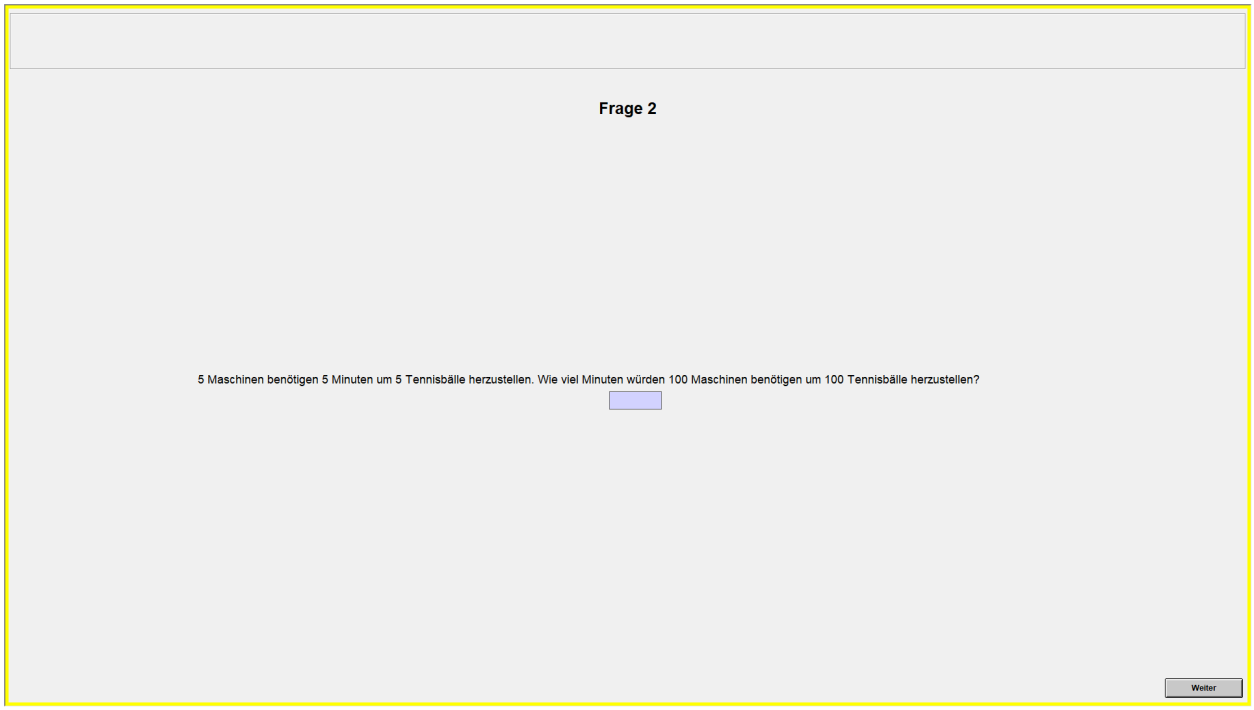


Figure C.24: CRT Question 2, all treatments.

Notes: 'Question 2. 5 machines need 5 minutes to make 5 tennis balls. How many minutes would 100 machines need to make 100 tennis balls? Continue."

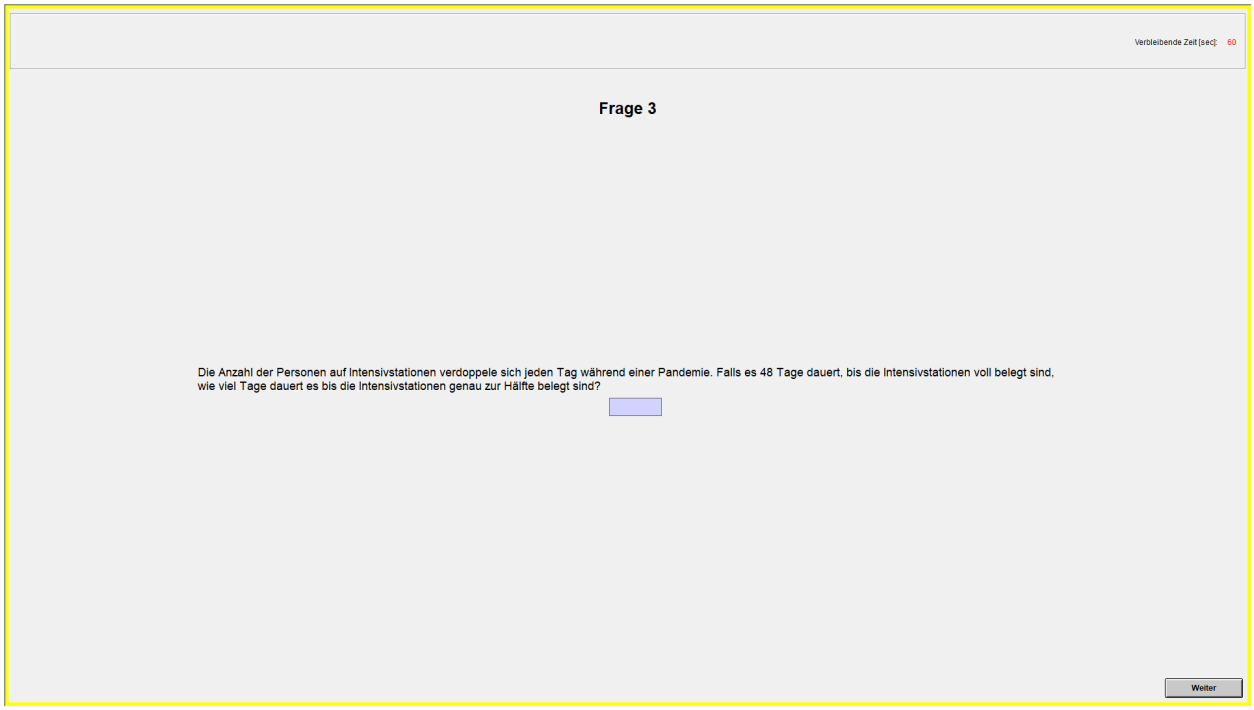


Figure C.25: CRT Question 3, all treatments.

Notes: 'Question 3. The number of people in intensive care units doubles every day during a pandemic. If it takes 48 days for intensive care units to be full, how many days does it take for intensive care units to be exactly half full? Continue."

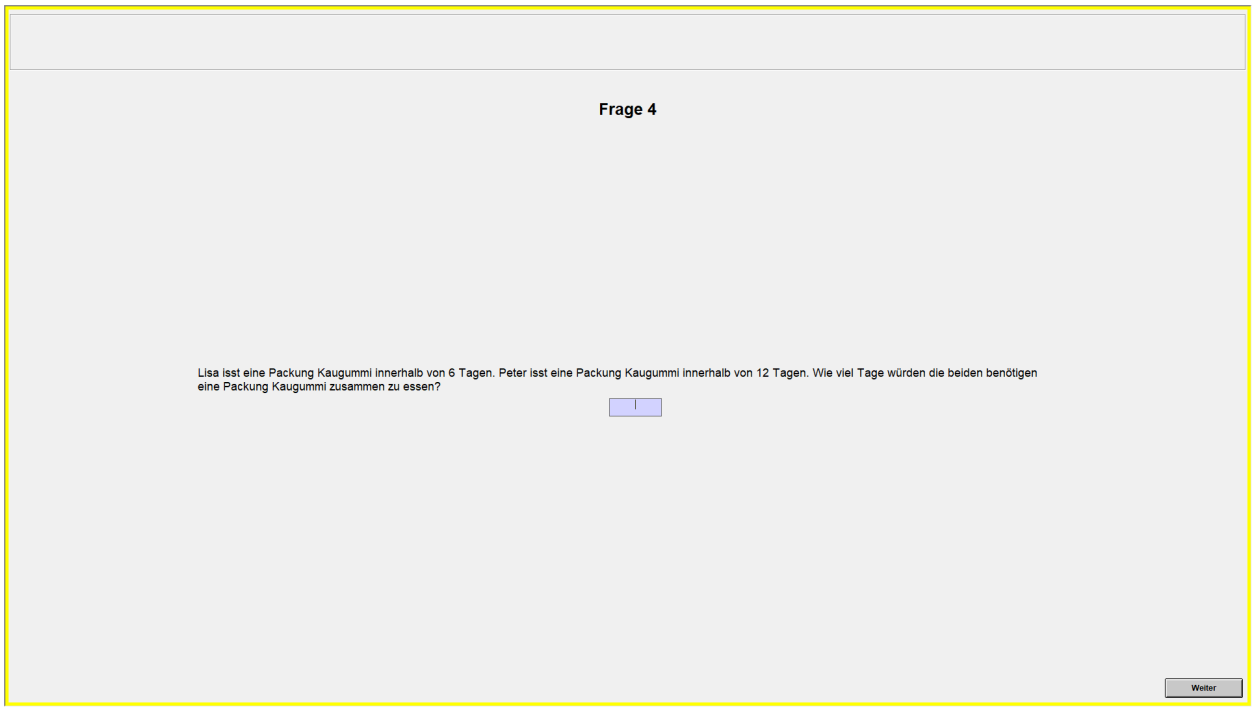


Figure C.26: CRT Question 4, all treatments.

Notes: 'Question 4. Lisa eats a pack of chewing gum within 6 days. Peter eats a pack of chewing gum within 12 days. How many days would it take the two of them to eat a pack of chewing gum together? Continue."

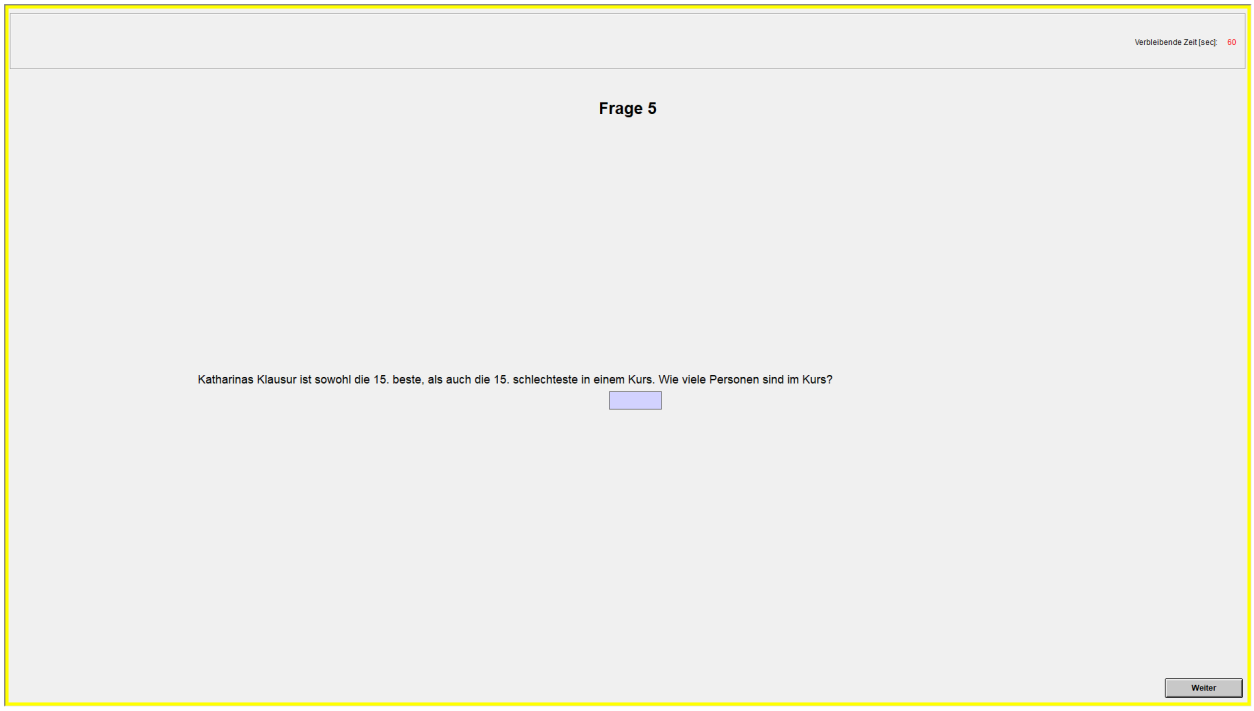


Figure C.27: CRT Question 5, all treatments.

Notes: 'Question 5. Katharina's exam is both the 15th best and the 15th worst in a course. How many people are in the course? Continue."

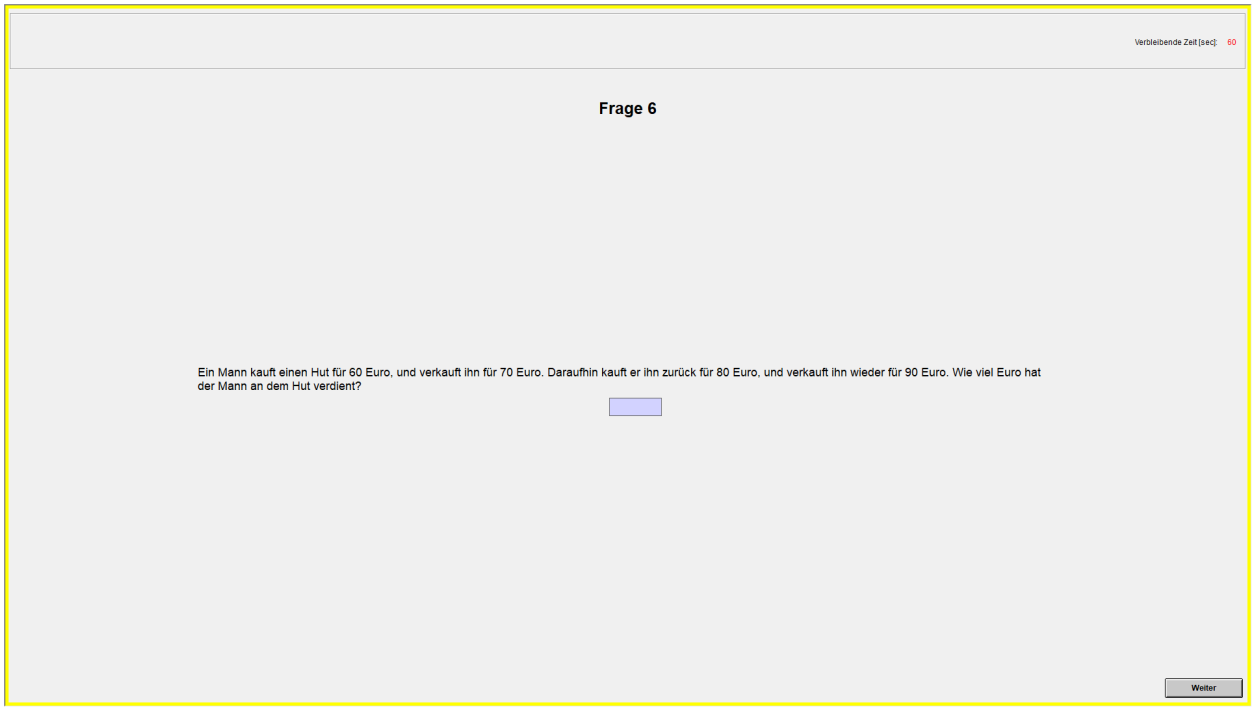


Figure C.28: CRT Question 6, all treatments.

Notes: 'Question 6. A man buys a hat for 60 euros and sells it for 70 euros. He then buys it back for 80 euros and sells it again for 90 euros. How much money did the man in the hat earn? Continue."

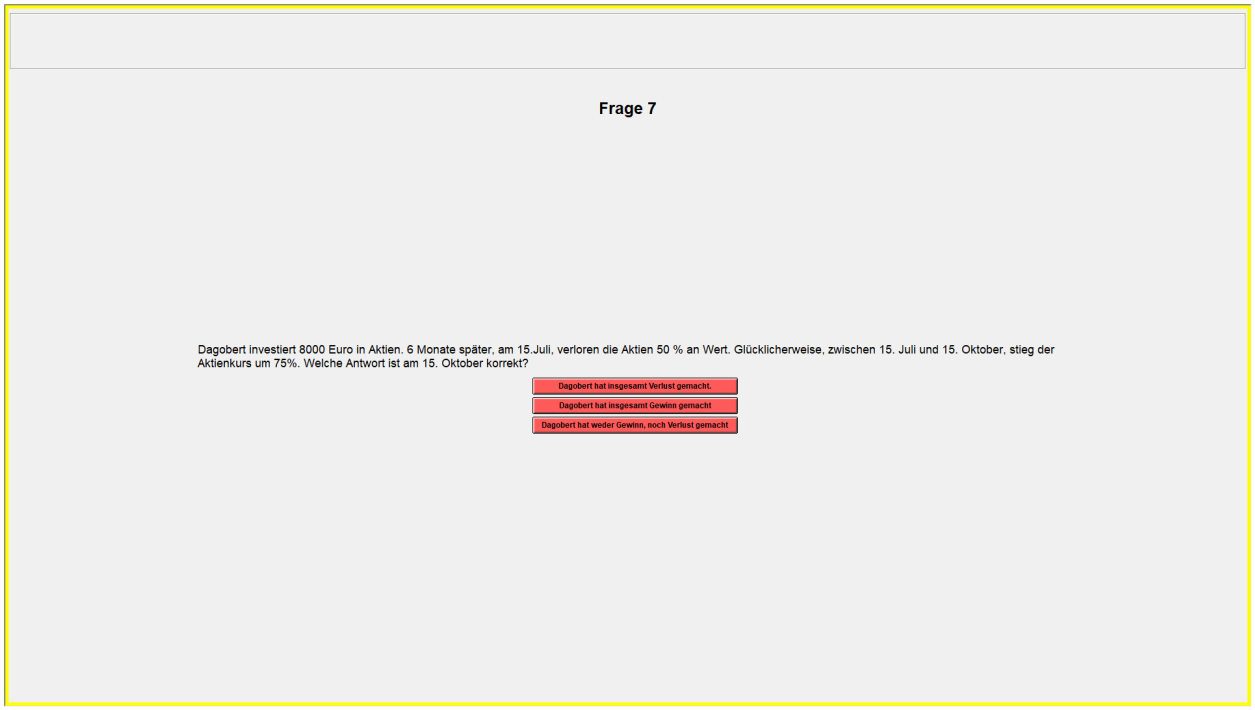


Figure C.29: CRT Question 7, all treatments.

Notes: 'Question 7. Dagobert invests 8000 euros in shares. 6 months later, on July 15, the shares had lost 50% of their value. Fortunately, between July 15th and October 15th, the stock price rose by 75%. Which answer is correct on October 15? Dagobert made a loss overall. Dagobert made a profit overall. Dagobert did neither profit nor loss."

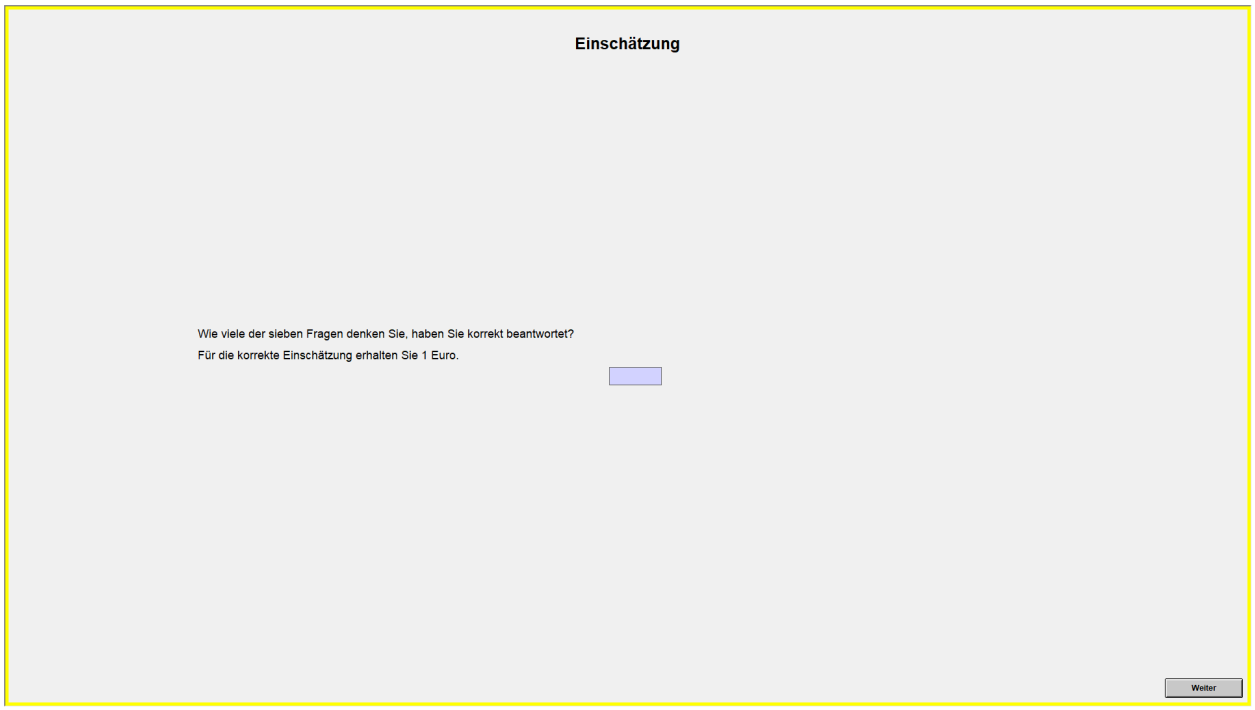


Figure C.30: CRT self evaluation, all treatments.

Notes: 'Assessment. How many of the seven questions do you think you answered correctly? You will receive 1 euro for the correct assessment. Continue."

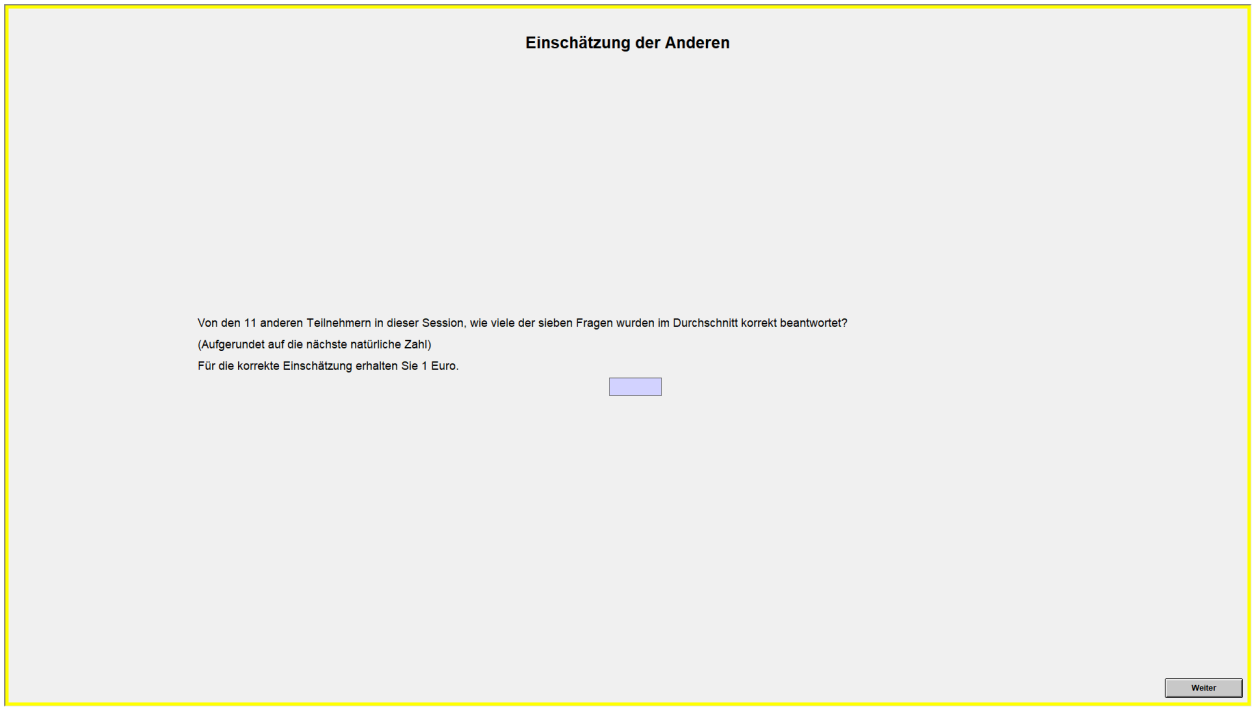


Figure C.31: CRT belief about others, all treatments.

Notes: 'Assessment of the others. Of the 11 other participants in this session, on average, how many of the seven questions were answered correctly? (Round up to the next natural number). You will receive 1 euro for the correct assessment. Continue."

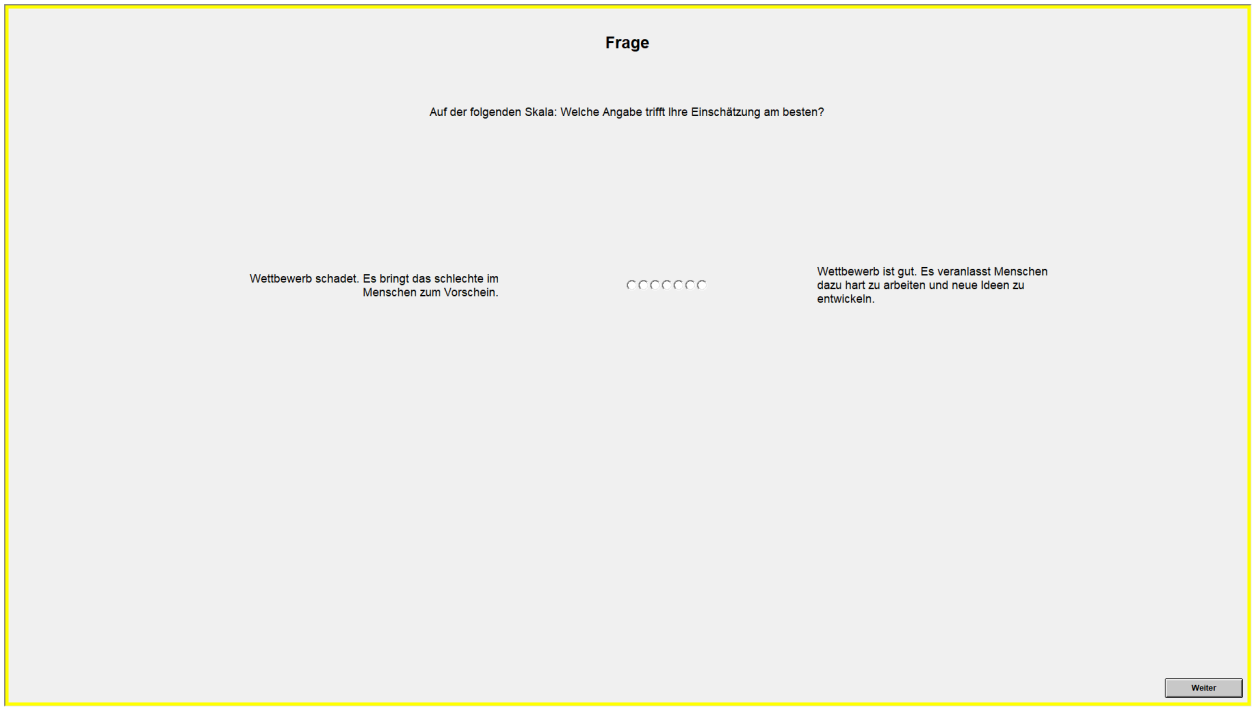


Figure C.32: Preference for competition question, all treatments.

Notes: 'Question. On the following scale: Which statement best describes your assessment? Competition hurts. It brings out the bad in people. Competition is good. It makes people work hard and come up with new ideas. Continue."

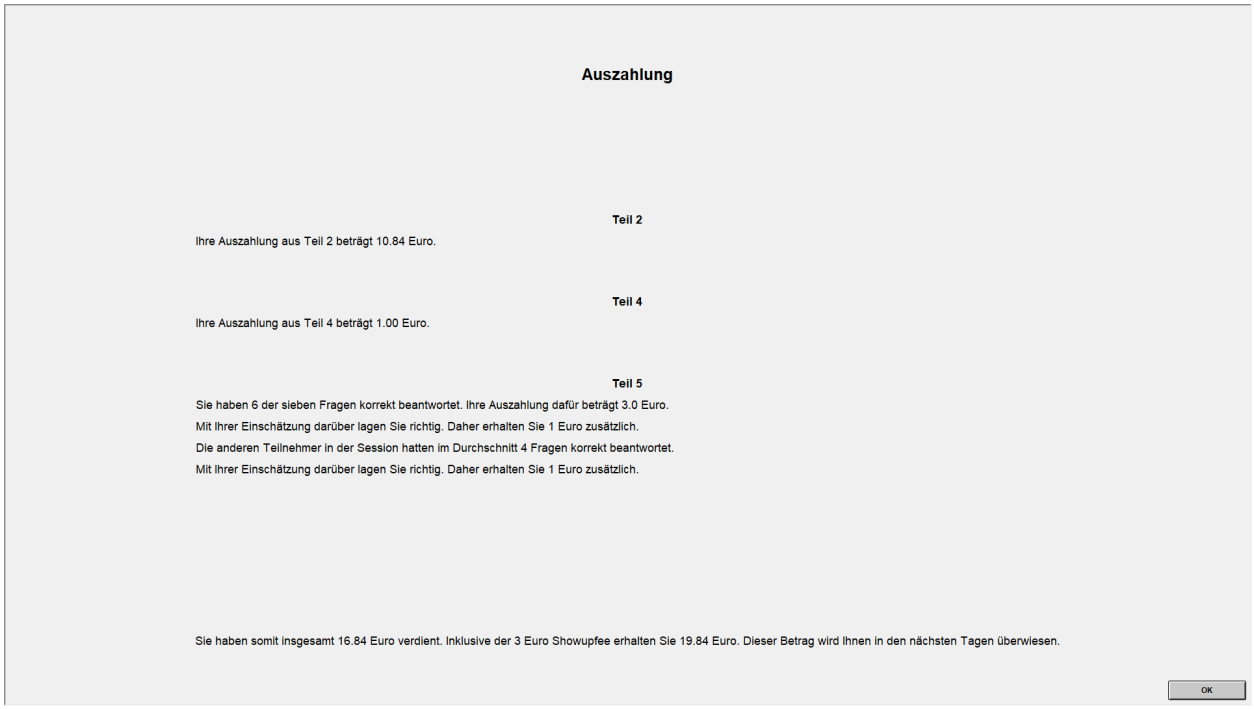


Figure C.33: Final Feedback, all treatments.

Notes: 'Payout. Part 2. Your payout from Part 2 is 10.84 euros. Part 4. Your payout from Part 4 is 1 euro. Part 5. You answered 6 of the 7 questions correctly. Your payment for this is 3 euros. You were correct in your assessment. Therefore, you will receive an additional 1 euro. The other participants in the session answered on average 4 questions correctly. You were correct in your assessment. Therefore, you will receive an additional 1 euro. You have thus earned a total of 16.84 euros. Including the 3 euros show-up fee you get 19.84 euros. This amount will be transferred to you in the next few days. OK."